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Tongass National Forest

Annual Monitoring & Evaluation Report for Fiscal Year 1999

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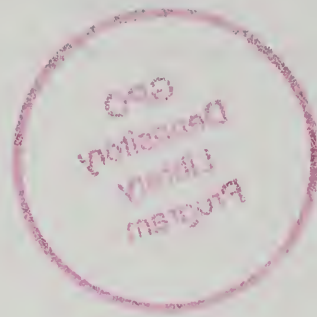
Enclosed is the Monitoring & Evaluation Report for the Tongass National Forest for Fiscal Year 1999. This reports Tongass National Forest monitoring, as specified in Chapter 6 of the Tongass Land Management Plan.

Monitoring and evaluation is a quality control process for implementation of the Land Management Plan. Information detailing implementation, effectiveness, and validation monitoring is provided through the Monitoring and Evaluation Report. The evaluation process provides feedback that identifies the necessity for corrective action to make management activities and their effects consistent with the Tongass Land Management Plan.

Additional copies of the Monitoring and Evaluation Report are available from the Ketchikan Supervisor's Office. Please contact Carol Seitz-Warmuth at 907-228-6341 with questions or requests for additional copies.

Sincerely,

THOMAS PUCHLERZ
Forest Supervisor
Tongass National Forest



Introduction

This is the second annual Monitoring and Evaluation Report produced by the Tongass National Forest under the revised Forest Plan approved in May 1997. It covers activities that were completed during fiscal year 1999 (October 1998 through September 1999).

Monitoring and evaluation is a quality control process for implementation of the Tongass Land and Resource Management Plan (TLMP). It provides the public, the Forest Service, and other concerned resource agencies with information on the progress and results of TLMP. As such, monitoring and evaluation comprise an essential feedback mechanism within an adaptive management framework to keep the Plan dynamic and responsive to changing conditions. The evaluation process also provides the feedback that triggers corrective action and the adjustment of plans and budgets, or both, so that they are realistic and being followed.

TLMP identifies management direction for the Tongass in terms of goals, objectives, and Standards and Guidelines -- all of which are based on underlying assumptions (policy, theory, data, and technology). Monitoring is the gathering of data and information and the observation of the results of management activities to provide a basis for periodic evaluation of the Forest Plan. Evaluation is a process for interpreting monitoring data and determining whether changes in management direction are needed.

This plan recognizes three types of monitoring and evaluation: implementation, effectiveness, and validation.

- *Implementation monitoring* is used to determine whether Standards and Guidelines are being implemented.
- *Effectiveness monitoring* is used to determine whether Standards and Guidelines, once implemented, are effective in achieving their goals and objectives.
- *Validation monitoring* is used to examine whether the assumptions, models, and predicted effects used in formulating the plan are accurate.

Interagency Monitoring and Evaluation Group

As directed by the TLMP Record of Decision (ROD), an Interagency Monitoring and Evaluation Group (IMEG) developed the precise protocols used for the sampling methods. These protocols are periodically updated to reflect the most recent survey and analysis procedures. The most current protocols are contained in the Monitoring and Evaluation Guidebook for the Tongass Land and Resource Management Plan, which is available upon request.

The role of IMEG is to develop and recommend to the Tongass Forest Supervisor and other IMEG member agencies specific monitoring protocols to respond to the monitoring questions specified in the Forest Plan. The members of IMEG work collaboratively to review and implement scientifically credible and cost effective monitoring and evaluation programs on the Tongass National Forest, consistent with the goals, objectives, and monitoring provisions of the Forest Plan. Such efforts include the development of specific monitoring projects, identification of available funding sources, and the analysis and/or interpretation of monitoring information.

Members of IMEG include: USDA Forest Service (Tongass National Forest), USDA Forest Service (Pacific Northwest Research Station), USDA Forest Service (Inventory and Monitoring Institute), Environmental Protection Agency, US Fish and Wildlife Service, National Marine Fisheries Service, Army Corps of Engineers, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, Alaska Division of Governmental Coordination, and Alaska Department of Natural Resources.

Relationship to Other Monitoring Activities

This Monitoring and Evaluation Report does not describe all monitoring, inventory, and data collection activities undertaken on the Tongass. Many additional activities are conducted under direction contained in site-specific project plans. Other monitoring and inventories also take place under the programmatic guidance for various resources such as wildlife, fisheries, and timber. Administrative studies performed by the PNW Research Station is another form of monitoring.

The answers to the monitoring questions contained in this Monitoring and Evaluation Report are not intended to replace monitoring requirements developed in the project planning process, other ongoing monitoring activities, or administrative studies. Specific project monitoring requirements are determined during the National Environmental Policy Act (NEPA) project planning process. Although there will be overlap between project level monitoring and Forest Plan level monitoring, no single project monitoring plan is expected to address all of the questions listed in the Monitoring and Evaluation Report. Some project level monitoring requirements in response to site-specific concerns may not be included in this report. Similarly, each resource may be doing some programmatic monitoring to improve management or knowledge that is not directly related to the Forest Plan goals, objectives or Standards and Guidelines. Their results are also not included in this report. Finally, other data gathering activities called Administrative Studies are being performed by the PNW Research Station in response to Appendix B of the Forest Plan entitled "Information Needs." These are inventory and research items that are useful or necessary, and can be thought of as "monitoring" in a broad sense of the term. Many of these items are often called "baseline" or "trend" monitoring. However, these items are not included in this report.

Annual Monitoring and Evaluation Reports

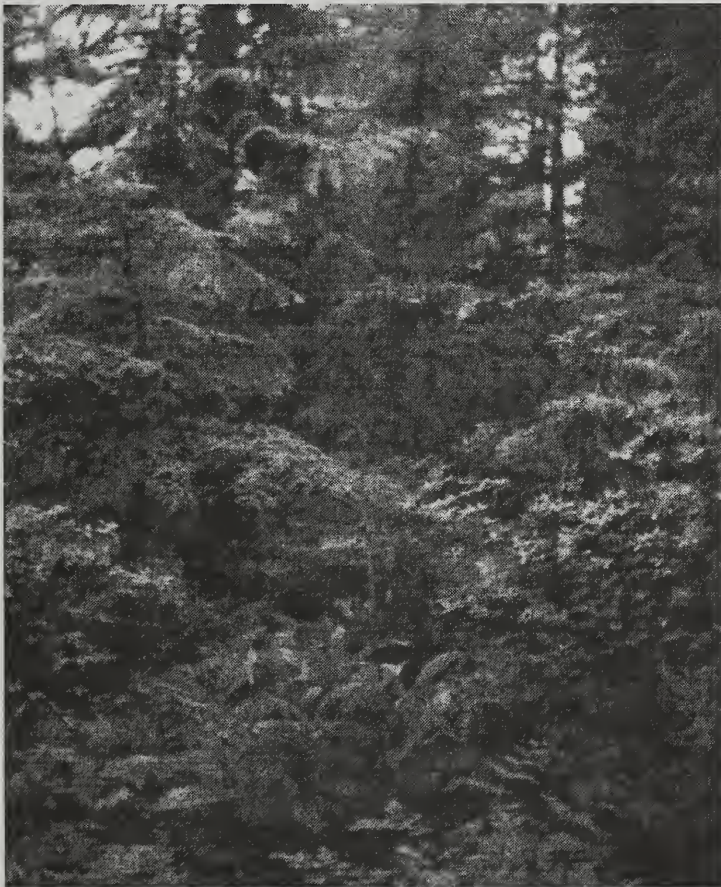
The Forest Supervisor is responsible for the coordination and preparation of this annual Monitoring and Evaluation Report. This report will summarize the monitoring activities conducted during fiscal year 1999 and the results obtained, address each of the monitoring questions listed in the Forest Plan, and evaluate the implementation of TLMP. Finally, this report will include recommendations for remedial action, if necessary, to make management activities and their effects consistent with the Forest Plan. The specific recommendations for corrective action depend on the risk to the resource and the type of disparity discovered. The types of actions that will be recommended include:

- No action, if monitoring and evaluation indicate that the Standards and Guidelines are being followed and the results are meeting Forest Plan objectives.
- Additional monitoring, if initial results are inconclusive or indicate a pattern of minor discrepancies between the Standards and Guidelines and their implementation, or between expected and actual results.
- Referral to the appropriate line officer for action to ensure proper application of the Standards and Guidelines, if compliance is inconsistent.
- Changing the projected output schedule, if it turns out to be unachievable given funding and other constraints.
- Revising the budget, if the anticipated costs of implementation of TLMP turn out to be incorrect.
- Amending TLMP to change, for example, the allocation of particular areas from one Land Use Designation to another, or changing one or more of the Standards and Guidelines.
- Revising TLMP if major changes are warranted.

Organization of the Report

Following is a description of how the monitoring and evaluation questions in the Forest Plan are addressed in this Report. Data collected for each monitoring item will be aggregated and evaluated on an annual basis unless otherwise noted. Monitoring items are sorted alphabetically by resource area and include the following components:

- 1) Topic
- 2) Goal
- 3) Objective
- 4) Background
- 5) Monitoring Question
- 6) Monitoring Results
- 7) Evaluation of Results





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Appendix

Tongass Best Management Practices Implementation
1999 Monitoring Report





Monitoring Questions

Air Quality

Is air quality meeting State and Federal ambient air quality Standards?

Biodiversity

Are contiguous blocks of old-growth habitat being maintained in a Forest-wide system of old-growth reserves to support viable and well distributed populations of old-growth-associated species and subspecies?

Are the effects on biodiversity consistent with those estimated in the Forest Plan?

Are management practices consistent with current knowledge regarding sensitive species conservation (federally listed threatened or endangered species, Alaska Region sensitive species, and State species of special concern)?

Are destructive insect and disease organisms increasing to potentially damaging levels following management activities?

Fish Habitat

Are population trends for Management Indicator Species (MIS) and their relationship to habitat changes consistent with expectations?

Are fish & riparian Standards and Guidelines being implemented?

Are fish & riparian Standards and Guidelines effective in maintaining or improving fish habitat?

Heritage Resources

Are heritage resources Standards and Guidelines being implemented?

Are heritage resources Standards and Guidelines effective in protecting heritage/cultural resources as expected in the Forest Plan?

Karst and Caves

Are karst and cave Standards and Guidelines being implemented?

Are karst and cave Standards and Guidelines effective in protecting the integrity of significant caves and the karst landscape?

Land Management Planning

Is the management of National Forest System lands consistent with management objectives of adjacent lands and their management plans?

Local and Regional Economies

Are the effects on employment and income similar to those estimated in the Forest Plan?

Has the Forest Service worked with local communities to identify and pursue Rural Community Assistance opportunities?

Minerals and Geology

Are the effects of mining activities on surface resources consistent with Forest Plan expectations, as allowed in approved Plans of Operations?

Recreation and Tourism

Are areas of the Forest being managed in accordance with the prescribed Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards & Guidelines?

Is Off Road Vehicle (ORV) use causing, or will it cause, considerable adverse effects on soil, water, vegetation, fish and wildlife, visitors, or cultural and historic resources of the Forest?

Research

Have identified high-priority information needs been fulfilled?

Scenery

Are the Standards and Guidelines effective in attaining the adopted Visual Quality Objectives established in the Plan?

Soil and Water

Are the Standards and Guidelines for soil disturbance being implemented?

Are the Standards and Guidelines effective in meeting Alaska Regional Soil Quality Standards?

Are Best Management Practices being implemented?

Are Best Management Practices effective in meeting water quality Standards?

Subsistence

Are the effects of management activities on subsistence users in rural Southeast Alaska communities consistent with those estimated in the Forest Plan?

Timber Management

Are timber harvest activities adhering to applicable timber management Standards and Guidelines?

Are harvested forest lands restocked within five years following harvest?

Is the Allowable Sale Quantity (ASQ) consistent with resource information and programmed harvest?

Are the Non-Interchangeable Components (NIC) of the Allowable Sale Quantity consistent with actual harvest?

Is the proportional mix of volume in NIC I and NIC II as estimated in the Forest Plan accurate?

Should maximum size limits for harvested areas be continued?

Transportation

Are the Standards and Guidelines used for forest development roads and Log Transfer Facilities effective in limiting the environmental effects to anticipated levels?

Wetlands

Are wetlands Standards and Guidelines being implemented?

Are wetlands Standards and Guidelines effective in minimizing the impacts to wetlands and their associated functions and values?

Wild and Scenic Rivers

Are Wild, Scenic, and Recreational River Standards and Guidelines being implemented?

Are Wild, Scenic, and Recreational River Standards effective in maintaining or enhancing the free flowing conditions and outstandingly remarkable values at the classification level for which the river was found suitable for designation as part of the National Wild and Scenic River System?

Wilderness Areas

Are Standards and Guidelines for the management of wilderness being implemented?

Are Standards and Guidelines for the management of wilderness effective in maintaining the wilderness resource?

Wildlife

Are population trends for Management Indicator Species (MIS) and their relationship to habitat changes consistent with expectations?

Are the population levels and associated distribution of mammalian endemic species on islands and portions of the mainland consistent with the estimates in the Forest Plan?

Costs and Outputs

What outputs were produced in the previous year?

Are the costs associated with carrying out the planned management prescriptions (including those of producing outputs) consistent with those costs estimated in Plan?



Monitoring Report

Air Quality

Goal: Maintain the current air resource condition to protect the Forest's ecosystems from on- and off-Forest air emissions sources.

Objective: Attain national and state ambient air quality Standards Forest-Wide.

Background: The air quality is addressed Forest-wide, but the actual monitoring takes place at one or more monitoring sites within local air sheds where there are known or suspected air quality problems. Refer to "Juneau Air Quality Monitoring Project, Mendenhall Valley data Summary, January 1985 – December 1995" published by the Alaska Department of Environmental Conservation, January 31, 1996.

Air Quality Question: Is air quality meeting State and Federal ambient air quality Standards?

The Tongass National Forest summarizes ambient air quality monitoring data the Alaska Department of Environmental Conservation (ADEC) has collected and analyzed in accordance with the Code of Federal Regulations (40 CFR Part 50). This data is stored in the Environmental Protection Agency's (EPA) Aerometric Information Retrieval System (AIRS) database, which is available to the public at <http://www.epa.gov/airsdata/monreps.htm> on the Internet.

ADEC's monitoring strategy is to focus its limited resources on the highest priority areas and pollutants (i.e., areas and pollutants most likely to exceed a public health standard). For Southeast Alaska, ADEC has focused most of its efforts during the 1990's on monitoring particulate matter in Juneau's Mendenhall Valley. Particulate matter less than or equal to 10 micrometers, or PM_{10} is measured in micrograms per cubic meter (ug/m^3). There are two Standards for PM_{10} : $150 ug/m^3$, measured as a 24-hour average; and $50 ug/m^3$, measured as an annual average.

A new standard of particulate matter less than or equal to 2.5 micrometers, or $PM_{2.5}$ is also measured in micrograms per cubic meter (ug/m^3). The two Standards for $PM_{2.5}$ are: $65 ug/m^3$, measured as a 24-hour average; and $15.0 ug/m^3$, measured as an annual average.

Monitoring Results

During 1999, the highest reported 24-hour value for PM_{10} in the Mendenhall Valley was $31 ug/m^3$, which is 21 percent of the standard. The second, third, and fourth highest 24-hour values were 30, 20, and $14 ug/m^3$, respectively. The annual average for 1999, based on a total of 55 observations, was $8.4 ug/m^3$, or 17 percent of the standard. The last time the PM_{10} Standards in Mendenhall Valley were exceeded were in 1993, when the three highest values were 313, 224, and $169 ug/m^3$.

Only three values for $PM_{2.5}$ were available. The highest reported 24-hour value for $PM_{2.5}$ in the Mendenhall Valley was $10 ug/m^3$, which is 15 percent of the standard. The second highest 24-hour value was $9.7 ug/m^3$.

Evaluation of Results

Assuming ADEC's monitoring strategy is sound and the data stored in EPA's AIRS database is reliable, air quality is meeting State and Federal air quality standards. The Mendenhall Valley (including about 5,000 acres of Tongass National Forest land) is officially listed as a non-attainment area for PM-10. There were no exceedances of either PM-10 standard on or adjacent to the Tongass National Forest during the five-year period from 1995 through 1999. The City and Borough of Juneau's control strategy, including its wood-smoke control program and its road paving projects, appears to be working.

Therefore, we recommend no corrective action with respect to air quality on the Tongass National Forest at this time. We recommend changing the sampling methods for Air Quality from "annually summarize and evaluate available information..." to "every five years summarize and evaluate information from the State Department of Environmental Conservation and the U.S. Environmental Protection Agency."



Biodiversity

Goal: Maintain healthy forest ecosystems; maintain a mix of habitats at different spatial scales (i.e., site, watershed, island, province, and forest) capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska.

Objective: Maintain a Forest-wide system of old-growth-forest habitat (includes reserves, non-development land use designations, and beach, estuary and riparian corridors) to sustain old-growth-associated species and resources. Ensure that the reserve system meets the minimum size, spacing, and composition criteria described in Appendix K of the Forest Plan. Provide sufficient habitat to preclude the need for listing species under the Endangered Species Act due to habitat conditions on National Forest lands.

Background: Two coarse-filter approaches are used here to monitor Forest biodiversity. The first focuses on the spatial distribution and composition of old-growth reserves and the cumulative harvest of old-growth timber by Biogeographical Province. It is assumed that the GIS database will be measured using a current layer. The second examines emerging information concerning sensitive species conservation on the Forest.

Biodiversity Question 1: Are contiguous blocks of old-growth habitat being maintained in a forest-wide system of old-growth reserves to support viable and well distributed populations of old-growth-associated species and subspecies?

The effects of management activities on the Tongass old-growth conservation strategy were determined by reviewing project level environmental documents and forest plan amendments for their effects on the spatial distribution, size, and composition of old-growth habitat reserves. This is consistent with the Biodiversity Evaluation Criteria and Sampling Methods listed in the Forest Plan.

Iverson (1997) provides a detailed evaluation of the old-growth habitat reserve (OGR) system that serves as a benchmark to the conditions of the old-growth habitat reserves system at the time the TLMP Revision ROD was signed. This analysis and other analyses (e.g., panel assessments) associated with the TLMP Revision (1997) concluded this strategy was largely sufficient. At this time we have no information indicating these OGR system analyses need to be updated other than to report changes in OGR boundaries. These changes are reported here.

Monitoring Results

Since the signing of the TLMP Revision Records of Decision in 1997 and 1999, eight environmental documents have changed the size or composition of old-growth reserves. These changes are summarized in Table 1. None of the changes significantly changed the spacing of the reserves.

In summary, lands within the old-growth habitat LUD have increased by 10,730 acres and now contain 3,809 more acres of productive old growth. Old-growth habitat reserves modified during FY 1998 and FY 1999 exceed productive old-growth requirements (Appendix K, TLMP 1997) by 6,623 acres (40 percent). These changes reduced the timber base available for timber harvest by 1,776 acres.

Evaluation of Results

Over the past two fiscal years, project level decisions have generally increased the size and improved composition of old-growth reserves. Contiguous blocks of old-growth habitat are being maintained in a forest-wide system of old-growth reserves to support viable and well distributed populations of old-growth-associated species and subspecies.

Recommendations

- 1) Continue to review and modify OGRs during project level planning.
- 2) Improve NEPA documents and GIS procedures to make it easier to track changes in OGRs.
 - a) Maintain a LUD coverage for each fiscal year.
 - b) Code OGR by size (large, medium, small).
 - c) Include the size and composition of the OGRs before and after the changes in the NEPA documents.
- 3) Continue to consider and review comments in Iverson (1997) for improving the size, spacing, and composition of old-growth reserves during project planning.
- 4) Although in the vast majority of cases FWS and ADF&G have fully participated with the FS, there is at least one case where interaction did not happen; we will assure to recruit participation adjusting OGRs during the NEPA process in the future.



Table 1. Summary of acreage changes in the Old Growth LUDs documented in project-level NEPA RODs during fiscal year 1998 ³.

| Project & FY ROD Signed | VCU | 5/97 OGR Acres (POG) | Guide line OGR Acres (POG) ¹ | Modified OGR Acres (POG) | Net Change OGR Acres (POG) | Net Change Suitable Acres ⁴ | Comments |
|--|--------------|-------------------------------|---|--------------------------------|----------------------------------|--|--|
| Canal Hoya 1998 | 5200 | 2,090 (1630) | 2,901 (,1450) | 9,210 (2,740) | 7,120 (1,110) | -151 | ▪ Expanded to meet size requirement |
| Chasina 1998 | 6800 | 1,525 (537) ² | 637 (318) | 2,202 (842) | 667 (305) | -78 | ▪ Too small due to private lands. ▪ Expanded meet size requirement |
| Control Lake 1998 | 5972 5971 | 5,073 (2,418) ² | 3,404 (1,702) | 4,596 (2,359) ² | -477 (-59) | +304 | ▪ Remove 2nd growth ▪ Improve connectivity ▪ Includes small part of 5980 |
| Crystal Creek (Delta Creek) 1998 | 487 | 2,800 (1,680) | 3,195 (1,598) | 4,100 (2,340) | 1,330 (660) | +6 | ▪ Include goat range ▪ Maintain corridor along Paterson R. ▪ Reduce 2nd growth |
| Crystal Creek (Brown Cove) 1998 | 489 | 4,650 (2,550) | 6,444 (3,222) | 4,840 (2,640) | 190 (90) | -372 | ▪ Add goat range ▪ Improve connectivity ▪ Brown Cove in same VCU |
| Crystal Creek (Pt Agassiz) 1998 | 489 | 2,350 (1,260) | part of Brown Cove | 2,270 (1,400) | -80 (140) | -306 | ▪ Reduce beach and riparian buffers ▪ Add high volume stands |
| Todhal Back 1998 | 443 | 1,557 (687) | 2,106 (1,598) | 2,159 (1,090) | 602 (403) | -361 | ▪ Meet POG requirements |
| Niblack EA 1998 | 6830 | 583 (344) | 1,414 (707) | 1,499 (828) | 916 (484) | +252 | ▪ Meet POG requirements |
| Nemo Loop Thoms Lake 1998 | 479 | 12,203 (7,157) | 10,000 (5,000) | 12,430 (7,917) | 227 (760) | -755 | ▪ Fixed mapping error to allow road corridor ▪ Improve connectivity |
| Sea Level 1999 | 756 | 1,160 (800) | 1,308 (654) | 1,395 (716) | 235 (-84) | -315 | ▪ Meet size requirement ▪ Improve connectivity |
| Total | | 33,991 (19,063) | 31,409 (16,249) | 44,701 (22,872) | 10,730 (3,809) | -1,776 | |

1) Required acreage (Appendix K, TLMP 1997)

2) Numbers not found in environmental document. It was determined by subsequent GIS analysis for this report.

3) All numbers are in acres; POG = productive old growth (volume strata high, medium, low); OGR = Old-growth reserve

4) Suitable acres are those that are suitable for timber harvest

Biodiversity Question 2: Are the effects on biodiversity consistent with those estimated in the Forest Plan?

Monitoring Results

Biodiversity analyses conducted for the Forest Plan assume that the amount of timber harvest is an index of potential effects on biodiversity. For this report, we assume that this approach is appropriate, and track timber harvest units for FY1998 and FY1999. These harvest units were placed into GIS and summarized by province and volume strata. During FY1998 and 1999, 3,416 and 3,586 acres of productive old growth (POG) were treated by some type of timber harvest method (clear-cut, clear-cut with reserves or partial cutting). Of these acres, 2,068 acres in year 1998 and 2,330 acres in 1999 were in the "high" volume stratum. Table 2 summarizes these acres by province and amount of harvest within the high volume stratum.

The Forest Plan allowed for an ASQ harvest of 267 MMBF in 1998, and 187 MMBF after the ROD was changed in April 1999. ASQs of 267 and 187 MMBF equate to an average annual harvest of 8,529 and 6,520 acres of POG, respectively, for the first decade of the plan.

Biodiversity analyses within the Forest Plan assume the maximum level of harvest. Since only half of the allowed harvest (about 3,500 acres in each year) has occurred during the first two years of plan implementation, the actual effects of timber harvest have been less than those forecast in the Forest Plan. It is too early in implementation of the Forest Plan to conclude whether this trend will continue throughout the decade.



Table 2. Acres of timber harvest during FYs 1998 and 1999 by Province and percentage of Total POG and high volume POG harvested.

| | Province | Acres harvested during FY 1998/1999 | Total POG acres | % POG harvested in FY 1998+1999 | High volume POG acres | % high volume POG harvested in FY 1998+1999 |
|--------------|-----------------------|---|--------------------|---------------------------------------|-----------------------------|--|
| 1 | Yakutat Forelands | 0/0 | 47,720 | 0 | 27,881 | 0 |
| 2 | Yakutat Uplands | 0/0 | 24,136 | 0 | 11,448 | 0 |
| 3 | East Chichagof Is. | 20/23 | 409,659 | 0.01 | 155,323 | 0 |
| 4 | West Chichagof Is. | 0/0 | 72,274 | 0 | 18,984 | 0 |
| 5 | East Baranof Is. | 312/133 | 97,888 | 0.45 | 31,768 | 0.94 |
| 6 | West Baranof Is. | 0/0 | 218,763 | 0 | 56,691 | 0 |
| 7 | Admiralty Is. | 0/0 | 591,407 | 0 | 337,194 | 0 |
| 8 | Lynn Canal | 0/0 | 155,577 | 0 | 62,363 | 0 |
| 9 | North Coast Range | 0/0 | 324,305 | 0 | 131,789 | 0 |
| 10 | Kupreanof/Mitkof Is. | 513/490 | 318,928 | 0.31 | 104,893 | 0.48 |
| 11 | Kuiu Is. | 0/431 | 302,451 | 0.14 | 173,022 | 0.21 |
| 12 | Central Coast Range | 0/0 | 245,065 | 0 | 105,020 | 0 |
| 13 | Etolin Is. | 0/120 | 229,765 | 0.05 | 82,216 | 0.13 |
| 14 | North Central POW | 1,903/1,188 | 531,261 | 0.58 | 220,131 | 0.86 |
| 15 | Revilla Is./Cleveland | 668/1,152 | 520,989 | 0.35 | 254,814 | 0.46 |
| 16 | South Outer Islands | 0/48 | 115,487 | 0.04 | 50,784 | 0.07 |
| 17 | Dall Is. and Vicinity | 0/0 | 68,326 | 0 | 33,925 | 0 |
| 18 | South POW | 0/0 | 161,981 | 0 | 74,361 | 0 |
| 19 | North Misty Fiords | 0/0 | 198,824 | 0 | 77,162 | 0 |
| 20 | South Misty Fiords | 0/0 | 312,945 | 0 | 111,452 | 0 |
| 21 | Ice Fields | 0/0 | 115,821 | 0 | 37,798 | 0 |
| Total | | 3,416/3,585 | 5,063,572 | 0.14 | 2,159,091 | 0.20 |

Evaluation of Results

- 1) Continue to monitor timber harvest levels as an index of the effects of management on biodiversity.
- 2) Continue to support efforts to construct better maps of existing vegetation for the Tongass NF.
- 3) Continue to develop GIS to track type of harvest method so partial-cut acres can be reported separately from clear-cut acres.

Biodiversity Question 3: Are management practices consistent with current knowledge regarding Sensitive Species conservation?

Whether a species should be listed as sensitive by the Regional Forester for the Tongass National Forest is largely dependent on whether Forest Service approved projects or activities are posing a risk to the species' continued existence at the scale of the entire watershed. Analyses for the Forest Plan already assured that species would remain viable at the scale of the entire National Forest. The Forest Plan land allocations and Standards and Guidelines (S&G's) provide considerable distribution of native habitats. A species only needs to be on the Sensitive species list if the TLMP land allocations and S&G's are not adequate to assure that the species will remain well distributed. A complete report of the findings summarized below is available upon request from the Forest Service.

This monitoring question has two components:

- Are there currently Region 10 Sensitive Species that should be dropped from the Regional Forester's official Sensitive Species list, or are there species that the Regional Forester should consider adding to the Sensitive Species list (potential sensitive species)?
- Are the Forest Plan Standards and Guidelines (S&G) effective? Is there an identified need for revision regarding Threatened and Endangered (T&E) species, Regional Forester Sensitive species or potential sensitive species?

These two components are addressed in two sections:

- Review of the Biological Assessments (BAs) and Biological Evaluations (BEs) on animals and plants that were finalized for the Tongass National Forest during the fiscal year 1999 (October 1, 1998 to September 30, 1999).
- Review of letters from other agencies during the same period.

Monitoring Results

Review of BA/BE Results on Animals

For the seven federally listed species that were addressed in BAs this year, the following determinations were made: 102 determinations were No Effect, 10 were Not Likely to Affect, and 5 were Will Not Reduce Viability on the Tongass. Two BAs did not make a determination.

Nine species are listed on the Regional Forester's Sensitive Species List. Of the 85 BEs written in fiscal year 1999 on the Tongass National Forest, 44 addressed animal species, 27 addressed plant species, 1 addressed fish species, and 13 addressed both plant and animal species.

The animal BEs made the following determinations: 88 were No Effect, 52 were Not Likely to Affect, 14 were Will Not Reduce Viability on the Tongass, 14 were May Affect either individual or population, 12 were May Affect individuals but not likely to affect population, 1 was Will Affect and 1 was Will Affect but Mitigated determinations. Fourteen BEs did not make a determination on one of the species.

Fifteen additional animal species have been addressed as species of concern, and the Regional Forester's Sensitive Species List may need amending. These species have received this consideration because of questions about their viability. Both plant and animal species are on this list, and will be discussed under the Potential Sensitive Species categories. This year's animal BEs made the following determinations for species of concern: 37 were No Effect, 41 were Not Likely to Affect, 1 was Will Not Reduce Viability on the Tongass, 4 were May Affect either individual or population, and 6 were May Affect individuals but not likely to affect population determinations. Seven BEs did not make a determination on one of the species.

Species Discussion on Animals and Fish

Animal species that received a No Effect or Not Likely to Affect 100 percent of the time were: (1) Eskimo Curlew, (2) Snake River sockeye salmon, (3) Fish Creek chum salmon, (4) Island Run and Wheeler Creek king salmon, (5) dusky Canada goose, (6) humpback whale, (7) Pacific herring – Lynn Canal/Juneau stock, (8) bull trout and (9) arctic peregrine falcon. Additionally, the Aleutian Canada goose had 100 percent of its responses in the Will Not Reduce Viability on the Tongass category.

Seven animal species were not mentioned this year in any BA/BE: (1) northern pike, (2) Montague Island tundra vole, (3) harbor seal, (4) Kittlitz's murrelet, (5) mountain goat, (6) Prince of Wales flying squirrel and (7) Prince of Wales spruce grouse. Of these species, the northern pike was considered for removal from the list last year.

The Stellar sea lion, Snake River Chinook salmon and the Olive-sided flycatcher would have been in the first category but some of the responses did not make a determination. The remainder of the animal species had one or more determinations in categories of May Affect or Will Affect.

None of the T&E species received a May Affect or Will Affect determination. Of the Forest Service Sensitive species, 7 percent of the determinations were May Affect either individuals or populations, 6 percent of the determinations were May Affect individuals but not the population, and less than 1 percent of the determinations were Will Affect or Will Affect but Mitigated determination.

Of the species that have the potential to be listed as Forest Service Sensitive species, 4 percent of the determinations were May Affect either individuals or populations and 6 percent of the determinations were May Affect Individuals but not the population determination. All other determinations were No Effect, Not Likely to Affect, and Will Not Reduce Viability on the Tongass.

Responses from Other Agencies

There were four responses on BAs and two responses to BEs from other agencies concerning animal species this year. Of the four responses to BAs, one did not have listed animals and a consultation was not needed, and three responded with a Not Likely to Adversely Affect determination.

The US Fish and Wildlife Service responded to one BE and made comments on the marbled murrelet, Queen Charlotte goshawk, gray wolf, mountain goat and neotropical migrant birds. The State of Alaska responded to one BE with concerns on fish habitat only; no wildlife issues were addressed. In all the responses to BA/BEs, we did not notice any discussion of changes to the species listed or the need to add or delete species from the list.

Review of BA/BE Results on Plants

The US Fish and Wildlife Service has one listed species that occurs in Alaska. It is not believed to occur on the Tongass National Forest. This species was not included in any BA/BE this year.

Twenty-three species are listed on the Regional Forester's Sensitive Species List. The 43 BEs that addressed plant species included: 275 determinations of No Effect, 209 were Not Likely to Affect, 100 were Will Not Reduce Viability, 88 were May Affect either individual or population, 85 were May Affect individuals but not likely to affect population, and 2 were Will Affect determinations. Two BEs did not make a determination on one of the species.

Of the nine species that are potential Regional Forester's Sensitive Species that were addressed in BEs this year, 98 determinations were No Effect, 59 were Not Likely to Affect, 45 were Will Not Reduce Viability, 17 were May Affect either individual or population, and 15 were May Affect individuals but not likely to affect population determinations. Two BEs did not make a determination on one of the species.

Species Discussion on Plants

BEs were completed on twenty-three species listed by the Regional Forester as Sensitive. Fifty-one to 68 percent of the determinations were either in the No Effect or Not Likely to Affect categories. The remainder were spread among the other categories. Most of the determinations were Will Not Reduce Viability on the Tongass, with a range of 5 to 23 percent.

Nine other species were addressed as potential Forest Service Sensitive Species. Results were similar to those above. Reviewing the Forest Service Sensitive species, about 12 percent of the determinations were May Affect either individuals or populations, 11 percent of the determinations were May Affect individuals but not the population, and less than 1 percent were Will Affect determinations. For the determinations of Will Affect, only individual plants would be affected, not entire populations.

Considering the potential plants which may be added to the Forest Service Sensitive Species list, 7 percent of the determinations were May Affect either individuals or populations and 6 percent were May Affect Individuals but not the population. All other determinations were No Effect, Not Likely to Affect and Will Not Reduce Viability on the Tongass.

Evaluation of Results

Management practices are consistent with current knowledge regarding Sensitive Species conservation. Review of the BAs and BEs shows the management practices. The letters and comments from agencies also support the finding of consistency.

Biodiversity Question 4: Are destructive insect and disease organisms increasing to potentially damaging levels following management activities?

Part 219 of the National Forest System Land and Resource Management Planning regulations (36 CFR section 219.12) requires the monitoring of forest health and determining if destructive insect and disease organisms have increased following vegetation management. Areas are identified where destructive insect and disease organisms have increased, and management practices are modified if these increase to damaging levels.

Monitoring Results

A key premise of ecosystem management is that native species have adapted to and evolved with natural disturbance events. Along with wind, avalanche, and other disturbance agents, insect and disease organisms are important factors in the Tongass National Forest. Most occurrences of insects and disease are natural and considered a contributing factor to ecosystem diversity.

Endemic levels of insect and disease activity are usually allowed to run their course. Heart rot decays are a key agent causing small-scale disturbance in the Forest, resulting in bole breakage in older trees. Average defect in late seral stands is approximately one third of gross volume.

The incidence of decay is significantly related to tree age. Hemlock and spruce less than about 100 years of age are generally sound. Older hemlock deteriorates at a faster rate than Sitka spruce. Based on research by James Kimmey, for Sitka spruce in age class 151 to 200 years, defect was 5 percent, while in hemlock it was 16 percent (Farr, 1976). At 300 to 400 years of age, spruce is relatively rot free, whereas decay in hemlock averages 30 to 40 percent on a board-foot basis (Farr, 1976). Research by Kimmey (1956) also indicates that volume losses are small in young trees.

Forest insect population trends are generally linked to weather conditions, rather than forest management practices. For example, the Spruce needle aphid occurred on 44,400 acres in Southeast Alaska from the southern end of Prince of Wales Island to Cape Fairweather in 1998. The winter of 1998 was generally mild for Southeast Alaska. In contrast, the winters of 1996 and 1997 were colder. Subsequent outbreaks

of Spruce needle aphid were less severe for those years, with 600 and 440 acres of land affected, respectively. Areas affected by the outbreak were late-seral spruce-hemlock forest, and not managed young-growth. Spruce beetle has been a rather minor problem on the Tongass compared to other lands in Alaska; however, outbreaks such as that brought on by extensive windthrow in the winter of 1990-1991 resulted in the buildup of a population of beetles that killed many acres of high-value Sitka spruce throughout Southeast Alaska. These spruce beetle outbreaks are short in duration. The annual pest survey will help to identify where mortality has most recently occurred so that affected trees can be harvested before they decay.

Annual aerial detection surveys are flown over Southeast Alaska by the State and Private Forestry branch of the US Forest Service, Forest Health Group. The location of insect and decline activity is mapped and entered in a geographic information system (GIS) database. In addition to the aerial survey work, on-the-ground site visits are also conducted. In general, current management reduces the incidence and severity of insect and disease occurrence by removing infected trees through timber harvest. Even-aged vegetation management (clearcutting, seed tree or shelterwood regeneration methods) removes defective trees with fungal infections or those with mistletoe. The Forest Plan estimates that approximately 80 percent of future harvests will use the even-aged system. Past management has been above this level. The young growth that results after an even-aged harvest is vigorous and usually decay-free.

Currently the Forest Service is exploring alternatives to clearcutting, in which portions of the stand are left as legacy (residual) trees, either as single trees or groups of trees. Questions have been raised as to whether increased blowdown and increased insect and disease damage will occur due to bole wounding of residual trees and/or retention of mistletoe and other infestations within the stand. These questions will be studied in a series of three research installations across the Tongass National Forest. Results of these studies will not be available for three to five years.

The most important diseases and natural declines on the Tongass National Forest in 1999 were wood decay of live trees, hemlock dwarf mistletoe, and yellow-cedar decline. Heart and butt rot fungi cause substantial decay in late seral spruce-hemlock forests. No serious insect or disease in young-growth stands was detected through monitoring efforts. The monitoring work conducted annually by the State and Private Forestry branch of the US Forest Service, Forest Health Group and the Forest Silvicultural staff is adequate.

Fish Habitat

Goal: Maintain or restore the natural range and frequency of aquatic habitat conditions on the Tongass National Forest to maintain the abundance and diversity of resident and anadromous fish.

Objective: Determine if our Best Management Practices and Forest Plan standards and guidelines have been implemented and if they are effective in protecting fish habitat and fish populations. Monitor key stream channel characteristics and representative fish populations to determine if trends attributable to forest management are evident.

Background: Fish and aquatic resources on the Tongass National Forest provide major subsistence, commercial, and sport fisheries. Abundant rainfall and watersheds with high stream densities provide a high number and diversity of freshwater fish habitats. These abundant aquatic systems of the Tongass provide spawning and rearing habitats for the majority of fish produced in Southeast Alaska. Maintenance of this habitat and high water quality is of concern to the public, State and Federal natural resource agencies, and Native organizations.

In 1999, major emphasis was placed on developing a coordinated approach for the various aspects of fish habitat monitoring. A technical team of Forest Service specialists and an advisory team of employees from the cooperating agencies were formed. The technical team met in June, and developed a rough plan for coordinating, or synthesizing, the aquatic monitoring. A draft report of that plan was prepared.

Fish Habitat Question 1: Are population trends for Management Indicator Species (MIS) and their relationship to habitat changes consistent with expectations?

Pilot monitoring was completed for cutthroat trout and Dolly Varden char populations and their habitat. The objectives were to determine the difficulty of locating streams meeting the specific criteria identified in the monitoring protocol, and to gain experience with the removal method for making population estimates and with the Tier 3 stream habitat survey. The protocol incorporates a design that requires monitoring streams before and after timber harvest. This first year of pilot monitoring only included streams that had no previous timber harvest.

No data was collected for coho and pink salmon that are also MIS. Final decisions on whether these species will be retained as MIS have not been made, and final protocols for monitoring their populations must still be developed. FWS, NMFS, and ADF&G continue to support retaining all four fish species as MIS.

Monitoring Results:

During the 1999 pilot-monitoring program, 16 streams across the Tongass National Forest were identified and field-verified that met the criteria specified in the monitoring protocol (Table 3).

These selection criteria included:

- streams with resident cutthroat and/or Dolly Varden;
- reaches upstream from migration barriers to prevent interaction with anadromous fish;
- FP3 or MM1 channel types; and
- no previous logging, but with planned future logging.

Other streams came close, but were disqualified for not meeting all the criteria. We have included data from one stream with an MC1 channel type. This stream may be dropped if a suitable substitute is identified.

Table 3. Summary of Stream Reaches for the 1999 Pilot Monitoring Project

| Ranger District | Stream Name | Year of Timber Harvest | Field Verified | Channel Type | Fish Species | Population Estimate | Habitat Survey |
|-----------------|-----------------------|------------------------|----------------|--------------|--------------|---------------------|----------------|
| Craig | Drinking Water Cr | 2001 | Yes | MM1 | Cut, DV | Yes | Yes |
| | N Perkins Cr | 2004 | Yes | MM1 | Cut, DV | Yes | Yes |
| Thorne Bay | No streams identified | | Yes | | | | |
| Ket/Misty | Montana Cr | 2001 | Yes | MM1 | Cut | Yes | Yes |
| | Ronnie Cr | 2001 | Yes | MM1 | Cut | No | No |
| | Gun Sight Cr | 2001 | Yes | MM1 | Cut, DV | No | No |
| | Bostwick Cr | 2003 | Yes | MM1 | Cut | No | No |
| | Emerald Cr | 2002 | Yes | MM1 | Cut | No | No |
| | Sea Level Cr | 2001 | Yes | MM1 | Cut | No | No |
| Wrangell | Gypsy Cr 1 | 2001 | Yes | MM1 | Cut | Yes | Yes |
| | Gypsy Cr 2 | 2001 | Yes | MC1 | Cut | Yes | Yes |
| | Hoya Cr | 2000 | Yes | FP3 | DV | No | No |
| Petersburg | N Arm Farragut Cr | 2002 | Yes | FP3 | Cut, DV | Yes | Yes |
| | Upper Tunehean Cr | 2000 | Yes | MM1 | Cut, DV | Yes | No |
| Juneau | Head of Dry Bay Cr 1 | 2003 | Yes | MM1 | DV | No | No |
| | Head of Dry Bay Cr 2 | 2003 | Likely | FP3 | DV | No | No |
| Hoonah | S Fork Freshwater Cr | 2003 | Yes | MM1 | Cut, DV | Yes | Yes |
| Sitka | No streams identified | | | | | | |
| Yakutat | No streams identified | | | | | | |

Population estimates for resident cutthroat and Dolly Varden were made in eight of the field-verified streams, and a habitat survey was completed for seven of the streams. Some streams had only cutthroat and some had both cutthroat and Dolly Varden. No sampled streams had only Dolly Varden (Table 4). The estimated number of cutthroat and Dolly Varden varied widely among the sampled streams. We anticipated finding more fish in FP3 channel types compared to the slightly steeper MM1 channels. This was generally true, although the highest estimated number of fish was from a 450-foot section of MM1 channel on Upper Tunehean Creek. Confidence intervals around the point estimates are generally tight due to the high percentage of capture.

Table 4. Fish Population Estimates and Confidence Intervals.

| Ranger District | Stream Name | Channel Type | Fish Species | Population Estimate | 95% C.I. |
|-----------------|----------------------|--------------|--------------|---------------------|-----------|
| Craig | Drinking Water Cr | MM1 | Cut | 3 | 3 to 3 |
| | Drinking Water Cr | MM1 | DV | 19 | 19 to 28 |
| | N Perkins Cr | MM1 | Cut | 18 | 18 to 18 |
| | N Perkins Cr | MM1 | DV | 11 | 11 to 11 |
| Ket/Misty | Montana Cr | MM1 | Cut | 31 | 31 to 42 |
| Wrangell | Gypsy Cr 1 | MM1 | Cut | 33 | 29 to 57 |
| | Gypsy Cr 2 | MC1 | Cut | 33 | 33 to 33 |
| Petersburg | N Arm Farragut | FP3 | Cut | 91 | 83 to 116 |
| | N Arm Farragut | FP3 | DV | 19 | 19 to 27 |
| | Upper Tunehean Cr | MM1 | Cut | 97 | 91 to 116 |
| | Upper Tunehean Cr | MM1 | DV | 54 | 47 to 85 |
| Hoonah | S Fork Freshwater Cr | MM1 | Cut | no estimate | |
| | S Fork Freshwater Cr | MM1 | DV | 19 | 19 to 32 |

The amounts of various habitat features important to fish are shown in Table 5. Complete data on reach lengths, total surface area, additional descriptions of the large woody debris, the pools, and substrate are available upon request. Comparison of data between streams is not as important as the eventual comparison of the habitat before and after timber harvest.

Table 5. Stream Habitat Survey Results

| Ranger District | Stream Name | Channel Type | Total Pieces LWD | Total Pool Area (M2) | Average Residual Pool Depth (M) | Length Undercut Banks (M) | Substrate (D50) (MM) |
|-----------------|----------------------|--------------|------------------|----------------------|---------------------------------|---------------------------|----------------------|
| Craig | Drinking Water Cr | MM1 | 62 | 132.3 | 0.31 | 131 | 68 |
| | N Perkins Cr | MM1 | 33 | 96.8 | 0.29 | 87 | 20 |
| Ket/Misty | Montana Cr | MM1 | 22 | 154.7 | 0.31 | 19 | 42 |
| Wrangell | Gypsy Cr 1 | MM1 | 83 | 455.1 | 0.60 | 47 | 102 |
| Wrangell | Gypsy Cr 2 | MC1 | 22 | 135.1 | 0.30 | 8 | 73 |
| Petersburg | N Arm Farragut Cr | FP3 | 62 | 460.6 | 0.49 | 20 | 30 |
| Hoonah | S Fork Freshwater Cr | MM1 | 41 | | 0.30 | | 30 |

Evaluation of Results:

The 1999 pilot monitoring program was completed. Monitoring sites were identified on six of the nine ranger districts that harvest timber. It is anticipated that additional searching will reveal more suitable monitoring streams. This is particularly true in watersheds that are available for timber harvest but without immediate plans for timber sales.

District and SO employees completed the population estimates. A crew of two or three persons made all estimates in a single day. Two experienced teams completed all the habitat surveys, in order to increase consistency. Habitat surveys are considered to be more subject to data errors than population estimates.

No trend analysis of the data is appropriate at this time. Potential trends in fish populations and habitat features due to forest management will only be possible following collection of several years of pre-harvest and post-harvest data.

Independent long-term data sets of cutthroat and Dolly Varden populations have been located recently in streams on Chichagof Island and in western Oregon. These will be useful, when combined with the data collected with this pilot, in determining the sample size needed to detect change in fish populations over time. These calculations will be completed, and the implications discussed with the Interagency Monitoring and Evaluation Group, before we launch into the long-term monitoring program.

Fish Habitat Question 2: Are Fish Riparian Standards and Guidelines being implemented?

The Best Management Practices (BMPs), described in the Soil & Water Conservation Handbook (Forest Service Handbook 2509.22, October 1996), define practices that provide protection for soil and water resources. The Fish Riparian Standards and Guidelines define site-specific measures to protect the resources. These standards and guidelines were monitored following a methodology described in the Tongass Monitoring Strategy. The Strategy was developed to provide direction for Forest Plan implementation monitoring.

Please refer to the 1999 BMP Monitoring Report for details on how the monitoring was conducted. The report is included in the Appendix. A summary of the findings for the fish and riparian resources relative to disturbance is given below. Additional details describing the implementation monitoring are included in the soil and water section of this report.

The BMP implementation monitoring included two distinct efforts: (1) 100 percent monitoring of the units and roads in final completion status, (2) Interdisciplinary Team (IDT) monitoring. The 100 percent monitoring was primarily conducted by Forest Service sale administrators and engineering representatives, with some assistance from resource specialists. A team of Forest Service employees and other Federal and State agency representatives conducted the IDT Monitoring. Included were sale administrators, engineering representatives, foresters, planners, and resource specialists from soils, water and fisheries. The IDT monitoring was conducted on a stratified random sample of more than a 10 percent sample of units and roads monitored during the 100 percent monitoring effort.

Monitoring Results**BMPs applicable to fish and riparian management**

- BMP 12.6 Riparian Area Designation and Protection
- BMP 12.6a Buffer Design and Layout (TTRA and other buffers)
- BMP 13.16 Stream Channel Protection
- BMP 14.6 Timing Restrictions for Construction Activities
- BMP 14.17 Bridge and Culvert Design and Installation (fish passage, etc.)

Best management practices (12.6, 12.6a, and 13.16) were applied on 80 harvest units during FY 1999. The following table shows the approximate number of linear feet of stream channel protected and the approximate number of stream buffer acres retained.

Table 6. Approximate Linear Feet and Acres of Stream Channel Protected.

| Stream Class | Linear feet of Stream Channel Protected | Approximate Acres Retained as a Streamside Buffer |
|---------------------|--|--|
| Class 1 | 2,650 | 12.1 |
| Class 2 | 2,000 | 9.2 |
| Class 3 | 60,869 | 138.9 |
| Class 4 | 59,617 | N/A |

100 Percent Monitoring

The table below shows the number of times the BMPs specific to riparian areas were monitored and BMPs were implemented.

Table 7. BMPs Implemented

| BMPs Applied | Number of Times the BMP was Appropriate for Use | Number of Departures from BMP Implementation | Number of Times Corrective Action Did Not Bring Action into Full Compliance with BMP |
|--------------|---|--|--|
| 12.6 | 42 | 7 | 2 |
| 12.6a | 55 | 1 | 0 |
| 13.16 | 79 | 0 | 0 |
| 14.6 | 36 | 1 | 1 |
| 14.17 | 44 | 0 | 0 |
| Totals | 256 | 9 | 3 |

In order to comply with the standards and guidelines, the following corrective actions were taken during timber sale administration:

- BMP 12.6 Riparian Area Designation and Protection – 5 of the 7 departures were fully corrected. Full compliance was not obtained where 6 trees were harvested within a Class II riparian buffer and 4 trees were harvested within a Class II, blue-and-white flagged TTRA buffer. In the case of the Class II buffer, however, the buffer was greater than 120 feet so the minimum buffer required by TLMP was maintained.
- BMP 12.6a Buffer Design and Layout (TTRA and other buffers) – 1 departure was reported that was corrected to “full” implementation.
- BMP 13.16 Stream Channel Protection – There were no departures on this BMP.
- BMP 14.6 Timing Restrictions for Construction Activities – A bridge was removed outside the fish window with ADF&G consultation. Corrective action was taken and no damage to fish resources was apparent.
- BMP 14.17 Bridge and Culvert Design and Installation (fish passage, etc.) – There was no departure, and all best management practices to ensure fish passage were met in all cases.

10 Percent IDT Monitoring

The 10 percent monitoring was completed in three geographic areas: Hassler Island, Shrimp Bay, and Etolin Island. Hassler Island and Shrimp Bay are located on the Ketchikan Ranger District, and Etolin Island is located on the Wrangell Ranger District. The Interagency Monitoring and Evaluation Group (IMEG) selected the monitoring locations based upon the significant aspects of the unit harvest and road construction associated with these areas.

The 10 percent quality control monitoring completed by IDT was generally in agreement with the monitoring completed by the sale administrator and engineering representative, and showed that the BMPs and Standards and Guidelines were being implemented. The roads reviewed at Hassler Island were not complete, so evaluation of the implementation of the BMPs was made at the sites prior to completion and during construction. Post-haul maintenance will be completed on the roads at Hassler Island and Shrimp Bay. The BMPs will be fully implemented prior to road final completion.

The 10 percent IDT identified concerns in a few individual cases, as follows:

BMP 12.6a Buffer Zone Design and Layout: IDT and sale administrator rated Departure from full BMP implementation. Group observed 4 trees cut in stream buffer; fine was assessed on operator during contract administration. Buffer after trespass is greater than 120 feet; buffer is still intact.

BMP 14.14/ 14.17 Bridge and Culvert Design, Installation and Removal: IDT split rating between Departure from full BMP implementation and BMP fully implemented: Engineering representative rated BMP fully implemented; observation – most of road segment shows adequate spacing and effective culverts; need 1 more culvert. Concern addressed in BMP 14.9. Road not complete; additional culverts will be added as necessary.

IDT split rating between Departure from full BMP implementation and BMP fully implemented: Engineering representative rated BMP fully implemented; observation – most of road segment shows adequate spacing and effective culverts; a few more culverts possibly needed. Road not complete; additional culverts will be added as necessary.

IDT and engineering representative rated BMP fully implemented; question about ADF&G concurrence on one culvert (culvert required fish passage but no timing restrictions). MOU between ADF&G and Forest Service signed 3/16/98; since the culvert was installed before 2/5/98, the specific date of installation was not significant at the time of installation and was not recorded.

Evaluation of Results

The Standards and Guidelines for fish and riparian areas are being implemented during timber sale administration and road construction. The general consistency of the ratings by the sale administrators, engineering representatives and IDT illustrates the effective monitoring system for implementation of the BMPs. The sale administrators and engineers have a strong understanding of the best management practices and actions necessary to implement the associated Standards and Guidelines. Modification of the monitoring form and application of the form is necessary to ensure continued consistency in its application.

This monitoring question shares components with Soil and Water question 1 and 3, and Wetlands question 1. These questions should be combined to discuss all the BMP implementation monitoring. A full and detailed discussion of the BMP implementation monitoring is included in the annual BMP monitoring report.

Fish Habitat Question 3: Are Fish and Riparian Standards and Guidelines effective in maintaining or improving fish habitat?

Question 3 is answered by the following four monitoring efforts:

- Stream buffer stability
- Stream buffer effectiveness
- Channel condition assessment
- Fish passage

Stream Buffer Stability

The vegetation inherent in riparian buffers is recognized as an important controlling factor and component in maintaining the natural range and frequency of aquatic habitat conditions. The Tongass Land Management Plan contains several riparian standards and guidelines that are intended to retain the integrity of streamside buffers. These include: 1) maintain natural and beneficial quantities of large woody debris (LWD) over the short and long term, 2) maintain stream banks and stream channel processes, 3) provide for the beneficial uses of riparian areas by maintaining water quality, and 4)

maintain optimum salmonid stream temperatures. By retaining riparian vegetation in a condition found within the range of natural variability, it is anticipated that these standards and guidelines can largely be achieved.

Windthrow is a natural and important phenomenon of Southeast Alaska. It recycles forest stands, and maintains and renews the forest ecosystem. However, timber harvest has the potential to exacerbate the rate of windthrow in adjacent forest stands, including riparian buffers, beyond that found within the natural range of variability. Monitoring the incidence of windthrow in riparian buffers will assess if the buffers are retained in a condition found within the natural range of variability.

Monitoring Results and Evaluation

A protocol to monitor the incidence of windthrow in riparian buffers was developed during 1999, and is contained in the *TLMP Monitoring and Evaluation Guidebook*. This protocol monitors all riparian buffers of Class I, II and III streams on the Tongass NF that are associated with timber sales that are consistent with the revised TLMP. The condition of the buffers over time will be documented and measured with the use of low-altitude digital still aerial photographs.

Nineteen stream buffers within 13 harvest units located on three ranger districts are designated for initial monitoring. Additional riparian buffers will also be delineated and monitored as associated units are harvested. Eleven of the initial stream buffers are adjacent to fish streams (Class I and II), while the remaining eight stream buffers are adjacent to high-gradient (Class III) streams (see Table 8). The 19 designated riparian buffers are all the buffers prescribed under the revised TLMP and that are associated with harvest units harvested during 1999.

No monitoring of windthrow was completed within any of the 19 riparian buffers prior to the preparation date of this report. The initial intention was to obtain digital still photographs of the riparian buffers during October of 1999 to document and measure pre-windthrow conditions. The digital images were not obtained, due to unusually poor weather conditions and problems with aircraft availability during this period. Currently, a De Havilland Beaver is the only aircraft that can accommodate the digital camera. In addition, the protocol requires a flight ceiling of 2,500 feet above the terrain to obtain the photographs. Progress is being made toward developing the capability to equip other fixed-wings and helicopters with the digital camera. This will decrease the constraints imposed by aircraft availability and weather. In addition, the use of a helicopter will potentially increase photographic resolution and spatial accuracy.

Digital images of the 19 riparian buffers will be obtained when conditions allow. Table 8 describes the buffers slated for monitoring.

Table 8. 1999 Riparian Buffers Designated for Windthrow Monitoring

| Ranger District | VCU | Harvest Unit | Timber Sale | EIS/EA | Stream Class | Process Group |
|-----------------|-------|--------------|-------------------|------------------|--------------|---------------|
| Petersburg | 437 | 138 | Dakota | South Lindenburg | III | HC |
| | 437 | 138 | Dakota | South Lindenburg | II | HC |
| | 442 | 537A | Bo | Bohemia | I | LC1 |
| | 442 | 537A | Bo | Bohemia | I | MM2 |
| | 450 | 5 | Two Socks | Froot | II | PA |
| | 450 | 5 | One Ring | Froot | II | PA |
| | 447 | 25 | Rock Twin | Twin Creek | II | MM1 |
| | 447 | 25 | Rock Twin | Twin Creek | III | HC |
| Wrangell | 464 | 1A | Etolin Small Sale | Turn & Etolin | III | HC5 |
| | 464 | 1C | Etolin Small Sale | Turn & Etolin | III | HC5 |
| | 479 | 3 | Nemo Loop | Nemo Loop | III | HC6 |
| Thorne Bay | 595 | 416 | Control Center | Control Lake | III | HC |
| | 595 | 419 | Control Center | Control Lake | III | HC |
| | 597.2 | 421 | Control Center | Control Lake | II | HC2 |
| | 597.2 | 421 | Control Center | Control Lake | III | HC5 |
| | 597.2 | 422 | Control Center | Control Lake | I | LAKE |
| | 597.2 | 422 | Control Center | Control Lake | II | MMI |
| | 533 | 245 | Big Creek | Lab Bay | I | FP4 |
| | 533 | 245 | Big Creek | Lab Bay | I | PA5 |

Stream Buffer Effectiveness

Monitoring Results

Due primarily to budget and personnel constraints, no re-surveys of post-harvest buffer effectiveness sites, or surveys of new sites, were conducted in 1999. To date, 25 permanent reference buffer effectiveness reaches/sites have been established along sale unit boundaries located throughout the Tongass. The reference reaches are along Class I and II streams in six stream channel process groups. Baseline data has been collected. Five sites have been re-surveyed subsequent to (pre-TLMP) harvesting activities.

Work is presently under way to complete case studies of the two Hoonah Ranger District sites along Class I streams that have 2 to 3 years of post-harvest (pre-TLMP) survey data. Documented results from the study are not available yet. The studies are focusing on changes in:

- Number and size of pools
- Number of large woody debris pieces
- Cross-section (width-to-depth ratio) and longitudinal profiles
- Substrate particle size distributions

Monitoring Evaluation

One proposal that is being considered for the future is to continue monitoring 7 of the 25 permanent reference sites using the R10 Stream Survey Tier II habitat survey protocol. These sites are on the Hoonah, Thorne Bay, Craig, Petersburg and Wrangell ranger districts. Channel process groups are the Flood Plain (FP), Alluvial Fan (AF) and Moderate Gradient Mixed Control (MM), which are sensitive to impacts and watershed events. The two case study sites on the Hoonah Ranger District are included in the group that is recommended for continued monitoring.

For the year 2000, new sites may be added that include Class I and II stream buffers in stream channels sensitive to impacts (MM, FP). However, due to the implementation of current TLMP S&Gs for riparian area management, few valley-bottom harvest units with a riparian buffer on Class I or II streams are being planned. This will reduce the possibility of adding to the pool of stream buffer reaches. Re-survey of the suggested control reaches may occur in 2000.

Channel Condition Assessment

The Pacific Northwest Research Station is conducting a TLMP follow-up study, "Development of Protocols for Effectiveness Monitoring of Aquatic Habitat Conditions on the Tongass National Forest: a TLMP Information Need". The objective of this study is to test and revise protocols used for measuring stream channel condition, fish habitat, and fish populations. The Tongass National Forest has decided to use results of this study and additional data to be collected according to the study protocol to monitor potential changes in stream channels and fish habitat due to forest management.

Monitoring Results

Initial research identified objective, consistent, and repeatable measurements for assessment of the physical condition of stream channels, and concluded that the condition of undisturbed channels is markedly different from channels highly affected by land use. Subsequent research included watersheds with low and moderate management effects, and resulted in a blurring of channel condition distinction between managed and unmanaged watersheds. Surveys of physical variables have been completed one or more times on a total of over 50 stream reaches.

Fish in the study reaches are also being monitored. Measurements of salmonid abundance, species composition, and distribution have been completed on more than 30 reaches. Data analysis is in progress to determine salmonid response and variation to habitat measurements at multiple scales: reach, stream, and watershed.

Evaluation of Results

The initial results indicate measurable differences among stream channels with different land use histories. This preliminary finding, if verified through the remainder of the study, will be very helpful in evaluating channel responses to management actions.

Experience and preliminary analyses indicate that in order to collect objective, consistent, and repeatable data, the number of field crews should be minimized. For the physical measurements, two well-trained crews serving the north and south Tongass National Forest, respectively, appear to provide reasonable efficiency and adequate control of data collection errors.

Fish Passage

FY 99 Monitoring: Upstream Passage of Juvenile Fish at Road Crossings

Migration is essential for many fish species on the Tongass National Forest. Anadromous fish (fish that migrate from the ocean to freshwater to spawn) require access to spawning habitat. Juvenile anadromous fish migrate during their freshwater life stage, seeking seasonal habitats. Resident fish (fish that spend their entire life in freshwater) also may migrate seasonally in response to food, shelter and spawning needs.

Providing for fish passage at stream and road intersections to ensure fish migration is an important consideration when constructing or reconstructing forest roads. Improperly located, installed or maintained stream crossing structures can restrict these migrations, thereby adversely affecting fish populations. These structures can present a variety of potential obstacles to fish migration. The most common obstacles are excessive vertical barriers, debris blockages, and extreme water velocities that inhibit fish passage.

The Tongass Land Management Plan (TLMP) provides criteria to be used to assess fish passage. TLMP uses different fish passage standards for Class I streams (i.e., streams with anadromous or high quality resident fish habitat, or adfluvial fish habitat) than for Class II streams (i.e., usually small, high-gradient streams with resident populations of cutthroat trout and Dolly Varden char).

For Class I streams, standards state that juvenile coho will have unrestricted upstream passage within a defined range of stream flows. The stream flow at the upper end of this range is the stream flow that exists two days before and two days after a peak flow. The peak flow that is used is the flow that statistically recurs about once every two years and is known as the mean annual flood. This upper limit stream flow, or "fish passage design flow", is unique for each stream since it is based upon the specific hydrologic characteristics of that watershed. The fish passage design flow can be expressed as a Q_2 -4 day duration stream discharge. Q_2 refers to the mean annual flood discharge and the 4-day duration refers to the 2 day period before and after the Q_2 (Figure 1).

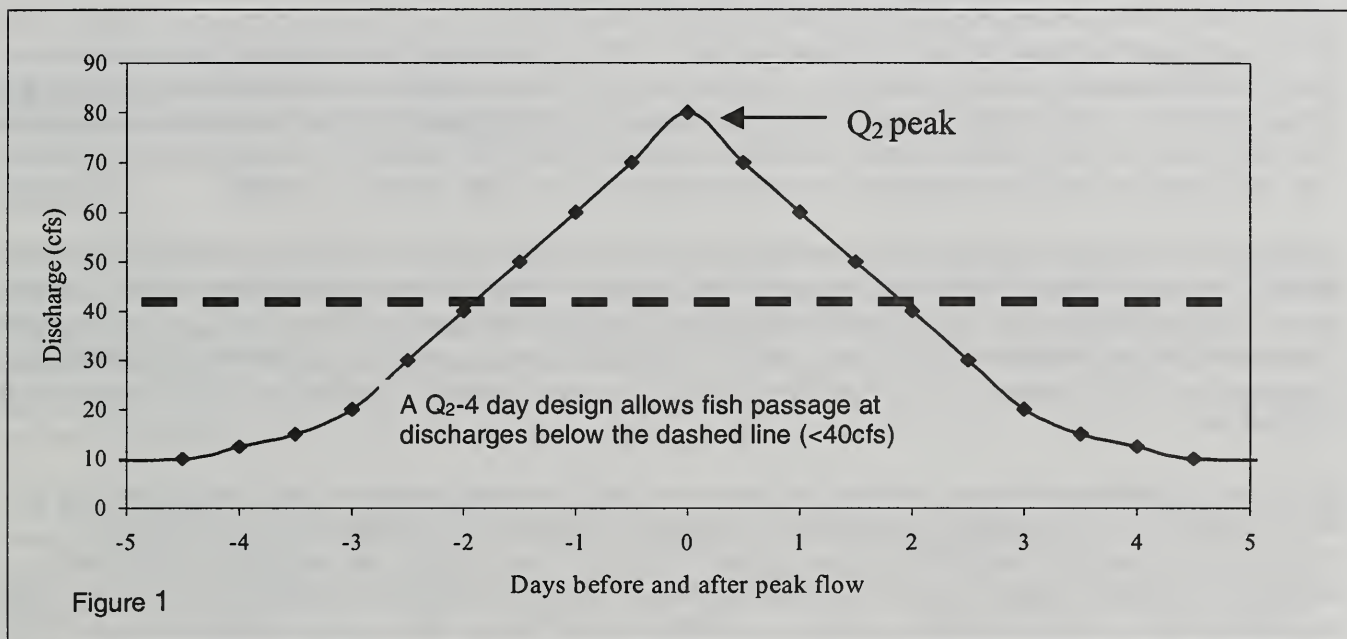


Figure 1 illustrates a hypothetical hydrograph that shows the relationship of time to stream discharge. The Q_2 peak is the highest discharge on the graph, and the dashed line indicates the discharge 2 days before and 2 days after the peak (i.e., the fish passage design flow). In this example, the Q_2 peak is 80 cubic feet per second (cfs), and the discharge at 2 days before and after this peak is 40 cfs. Therefore, the design flow is 40 cfs, which implies that a specified fish will be able to pass through the culvert at stream flows up to that amount.

For Class II streams, fish passage should generally be provided except for the occasional instance where it is not feasible to provide unrestricted passage to short sections of habitat. If fish passage is restricted, a feasibility analysis must be conducted which includes the cost and feasibility of providing unrestricted fish passage while considering sensitive or unique fish populations, cumulative impacts on fish passage in the watershed, and the stream linkages to the watershed. In addition, a Clean Water Act 404 permit will be applied for and received, as well as joint concurrence by ADF&G as required by the Forest Service-ADF&G Memorandum of Understanding (MOU), before fish passage is restricted. TLMP recognizes that fish passage will be restricted in some limited situations on Class II streams. This restriction would typically occur in high-gradient streams that contain short sections of habitat upstream of the road crossing. It is in these streams that the cost of providing fish passage is high and fisheries value is low. The design species for fish migration in Class II streams varies between fish species and different life stages, depending on the stream process group and the species present.

FY 99 Monitoring Results and Evaluation

Determining the effect of drainage structures on fish migration is a difficult process. It involves a great deal of complexity and variability, and the knowledge and tools to assess fish passage are evolving. Since actual fish passage is difficult to measure, most of the current fish passage work has been in developing a model to predict fish passage in the design of stream crossing structures under different stream conditions.

The model is based upon many assumptions in assessing fish passage capability. These assumptions pertain to stream hydrology, culvert hydraulics, juvenile fish swimming abilities, migration timing and the response of fish movements to stream discharge. The validity and significance of the results reported are only as good as the assumptions used to derive them. These assumptions need to be further tested and verified. In the coming years, more information will be forthcoming that will allow for improved confidence in the fish passage assumptions and estimates. The model needs to be tested against TLMP fish passage criteria and compared against other fish passage criteria relative to Coastal Zone Management Act (CZMA), Clean Water Act (CWA), and the FS-ADF&G MOU.

Much progress has been made in the last two years in the development of a modeling process to evaluate the capability of fish passage at road crossings. This process is described in the Monitoring and Evaluation Guidebook for the Tongass Land and Resource Management Plan. To date, insufficient data currently exists to adequately assess the effectiveness of TLMP fish passage standards and guidelines with this model for culverts installed or reconstructed after the 1997 revision of TLMP.

Along with the ongoing model development, an inventory of all fish streams along specified forest roads on the Tongass National Forest has begun. This inventory is part of the road condition survey. All fish streams are systematically located and information regarding fish species, drainage structure and stream characteristics are obtained. This new inventory information, along with any improvement as to the fish passage model, will enable us to better evaluate fish passage capability against the TLMP Standards and Guidelines.

The state of knowledge about juvenile fish movement and passage through culverts is improving and much is known (e.g., Juvenile and Resident Salmonid Movement and Passage through Culverts, Washington State DOT, July 1998, Thomas Kahler and Thomas Quinn). The work done so far has identified a need for more information in several areas. More information is needed to assess the ability of juvenile coho to pass through structures at different stream flows. We need to assess fish swimming capability in natural field conditions to verify the assumptions used in the mathematical predictions. Some modeling assumptions are based upon studies of species not native to the Tongass. More information is needed on the migration timing of juvenile fish to determine if the current Q₂-4 day duration design flow is an appropriate standard. More knowledge is needed on the biological implications of a delay in fish migration. There is a need for more information on the migratory habits of resident fish in high-gradient Class II headwater streams.

There is a recognized need for other resource agencies to work with the Forest Service to review and jointly develop the design standards that define fish passage. Fish passage standards and guidelines have evolved over time. Therefore, the assessment of the effectiveness of the standards and guidelines contained in the current TLMP can only be meaningfully conducted on drainage structures designed since the effective date of TLMP (May 23, 1997). Currently, data collection on the newly designed and installed drainage structures is incomplete. Fish passage data will be collected and analyzed on newly constructed and reconstructed roads that apply to the current TLMP standards and guidelines and presented in the annual report next year.

In the meantime, work is continuing to revise and refine the monitoring protocol and to inventory the stream crossing structures. Any fish passage problems are being identified and scheduled for correction in order to ensure fish passage to TLMP standards.

Special Supplemental Assessment: Stream Crossings Installed primarily before TLMP Revision Upstream Passage of Juvenile Fish at Road Crossings

The following is a preliminary assessment of fish passage capability at road crossings on the Tongass National Forest that primarily focuses on crossings that were installed prior to the release of the TLMP revision. This supplemental assessment is not intended to directly address the effectiveness of current TLMP fish passage standards and guidelines. As stated in the previous section, data collection is incomplete on the more recently designed structures that apply to the current TLMP. Efforts to date have been toward developing a fish passage capability model and collecting fish passage data on mostly older drainage structures.

This supplemental report uses the fish passage capability model and assesses mostly the older drainage structures designed and installed prior to the effective date of the current TLMP. Standards and guidelines for the installation of drainage structures in fish streams have become more stringent through time.

The intended use of this assessment is to prioritize drainage structures for more intensive investigation, leading to a more reliable evaluation of the structure's fish passage capability at the design flow. Following more intensive investigation, structures identified as not meeting current juvenile fish passage design flow standards are scheduled for corrective action.

Methods

The standards to which fish passage capability is evaluated against in this report are similar to those explained in the previous section, with the exception of the design flow. TLMP states a Q_2 -4 day design flow as a standard while this assessment uses a set of assumptions based on a more stringent, conservative design flow of Q_2 -2 day as the standard. The Q_2 -2 day design flow was used to be more conservative and because it is the design flow stipulated by the Coastal Zone Management Act (CZMA) and implemented by the Alaska Coastal Management Program.

The data for stream crossing drainage structures that are assessed in this report were obtained from the Alaska Region Road Condition Survey (FSH 7709.58-99-2). One of the objectives of the survey is to locate and characterize all the drainage structures within fish streams on the Tongass National Forest. This survey is on going and all fish stream crossings have not been located or characterized to date.

The preliminary assessment of juvenile fish passage capability is based on a set of assumptions developed by an interagency group consisting of the ADF&G, Forest Service, and Alaska Department of Transportation personnel. The assessment stratifies drainage structures by type, then establishes criteria thresholds for culvert gradient, stream constriction, debris blockage and vertical barrier specific for each stratified group to predict if fish passage is provided by each structure.

Three threshold categories are established and each fish stream is evaluated and placed in one of the three categories. The categories are defined as follows: 1) Green Category: Conditions assumed to meet the Q_2 2-Day duration design flow standard, 2) Red Category: Conditions assumed not to meet the Q_2 2-Day duration design flow standard, 3) Gray Category: Additional analysis required to determine if structures are in the Green or Red Category. A computer software application (FishXing) is used to perform the additional analysis required to determine the status of the Gray Category structures. The additional analysis was not completed for this preliminary report.

Perch, or vertical barrier at the outlet of the culvert, was calculated as a flow-dependent measurement and was derived by subtracting the elevation of the top of the water at the tail crest (i.e., the hydraulic control downstream of the culvert), at the time of sampling, from the elevation at the bottom surface of the culvert outlet. The Forest Service used water surface elevation measured at the tail crest to evaluate perch, which is flow dependent. ADF&G completed a quick query on the difference in statistics measuring perch height using tail crest, which is independent of stream flow. From a sample of 322

culverts (Class I and II), 203 were perched (greater than 4 inches) using water surface elevation: If tail crest were used, there would be an additional 18 culverts perched.

Results

Specific analysis of the stream road crossings relative to the threshold categories is illustrated in Table 9. The assessment characterizes fish stream road crossings that are currently and completely surveyed on the Tongass National Forest. This assessment includes stream road crossings on 546 Class II streams and 265 Class I streams from several ranger districts on the Forest.



| STRUCTURE TYPE | GREEN CATEGORY Conditions assumed to meet passage standards (Q ₂ -2day design flow) | | | GRAY CATEGORY Additional analysis required to determine status | | | RED CATEGORY Conditions assumed not to meet passage standards (Q ₂ -2day design flow) | | |
|---|---|----------------------|-----------------------|---|----------------------|-----------------------|---|----------------------|-----------------------|
| | CRITERIA | % of Class I Streams | % of Class II Streams | CRITERIA | % of Class I Streams | % of Class II Streams | CRITERIA | % of Class I Streams | % of Class II Streams |
| Bottomless pipe arch OR countersunk pipe arch AND 100% bedload coverage. | Culvert span to bedwidth ratio of 0.9 to 1.0 AND no blockage. | 2.3% | 3.1% | Culvert span to bedwidth ratio of 0.5 to 0.9 OR blockage >0% but ≤10%. | 2.3% | 0.4% | Culvert span to bedwidth ratio <0.5 AND blockage >10% | 0.0% | 0.6% |
| Countersunk pipe arches >=3x1 corrugation AND Bedload < 100% coverage. | Culvert gradient <0.5% AND no perch AND no blockage AND culvert span to bedwidth ratio > 0.75. | 0.7% | 0.0% | Culvert gradient between 0.5% - 2.0% OR perch >0.0' but ≤4" OR blockage >0% but ≤10% OR culvert span to bedwidth ratio between 0.5 to 0.75. | 1.8% | 0.4% | Culvert gradient >2.0% OR >4" perch OR blockage >10% OR culvert span to bedwidth ratio <0.5. | 3.8% | 2.6% |
| Circular CMP ≤ 48" span, AND spiral corrugations regardless of bedload coverage. | Culvert gradient <0.5% AND no perch AND no blockage AND culvert span to bedwidth ratio > 0.75. | 1.9% | 1.9% | Culvert gradient between 0.5% - 1.0% OR perch >0.0' but ≤4" OR blockage >0% but ≤10% OR culvert span to bedwidth ratio between 0.5 to 0.75. | 5.3% | 5.7% | Culvert gradient >1.0% OR >4" perch OR blockage >10% OR culvert span to bedwidth ratio <0.5. | 24.9% | 60.1% |
| Circular CMP's with annular corrugations > 3x1 and 3x1 spiral corrugations (>48" span), Bedload < 100% coverage. | Culvert gradient <0.5 % AND no perch AND no blockage AND culvert span to bedwidth ratio > 0.75. | 1.9% | 0.6% | Culvert gradient between 0.5% - 2.0% OR perch >0.0' but ≤4" OR blockage >0% but ≤10% OR culvert span to bedwidth ratio between 0.5 to 0.75. | 4.2% | 1.1% | Culvert gradient >2.0% OR >4" perch OR blockage >10% OR culvert span to bedwidth ratio <0.5. | 4.9% | 6.6% |
| Circular CMP's with ≥ ½ x 2 2/3 corrugations (all spans) and 3x1 spiral corrugations (>48 span), 100% bedload coverage. | Culvert gradient <1% AND no perch AND no blockage AND culvert span to bankfull ratio > 0.75. | 1.5% | 0.8% | Culvert gradient between 1.0% - 3.0% OR perch >0.0' but ≤4" OR blockage >0% but ≤10% OR culvert span to bedwidth ratio between 0.5 to 0.75. | 0.0% | 0.6% | Culvert gradient >2.0% OR >4" perch OR blockage >10% OR culvert span to bedwidth ratio <0.5. | 0.0% | 0.9% |
| Baffled OR multiple structure installations. | N/A | N/A | | All baffled OR multiple structure installations. | 6.0% | 4.0% | N/A | N/A | N/A |
| Log stringer OR modular OR permanent bridges OR removed structures. | All bridges or removed structures. | 38.5% | 10.6% | N/A | N/A | N/A | N/A | N/A | N/A |
| TOTALS | | 46.8% | 17.0% | | 19.6% | 12.2% | | 33.6% | 70.8% |

Table 9 - Preliminary evaluation of juvenile fish upstream passage at road crossings on the Tongass National Forest. Values express the percentage of the total number of fish streams that are within each "Structure Type" and "Category" group for both Class I or Class II streams. For example, 3.8% of all class streams surveyed are pipe arches with bedload coverage <100% and are assumed to have conditions that do not meet passage standards.

As displayed in Table 9, approximately 47 percent of Class I streams have conditions that are assumed to allow unrestricted upstream passage of juvenile fish (Green Category structures). Approximately 20 percent of the Class I streams require further analysis (use of FishXing software) to determine their status (Gray Category structures). Approximately 33 percent of Class I streams have conditions that are assumed to restrict the upstream movement of juvenile fish at the Q_2 -2 day design flow (Red Category structures). Approximately 17 percent of Class II streams have conditions that are assumed to allow unrestricted upstream passage of juvenile fish (Green Category structures). Approximately 12 percent of the Class II streams require further analysis (use of FishXing software) to determine their status (Gray Category structures). Approximately 71 percent Class II streams have conditions that are assumed to restrict the upstream movement of juvenile fish at the Q_2 -2 day design flow (Red Category structures).

Drainage structures in the Red category Class I and II streams are assumed not to be providing passage at the design flow due to four reasons or a combination of the reasons (Figures 1 and 2): 1) excessive stream constriction (leading to potentially excessive culvert water velocities in the culvert); 2) excessive culvert gradient (also leading to potentially excessive culvert water velocities in the culvert); 3) excessive culvert perch (creating a vertical barrier); 4) debris blockage within the culvert. More than 50 percent of the culverts in the Red Category Class I and II streams are assumed to be restricting juvenile fish passage due to a combination of the reasons mentioned above. The most prevalent reason for passage concerns in both Class I and II streams are culvert conditions that promote excessive water velocities in the culvert (culvert gradient, stream constriction, absence of bedload).

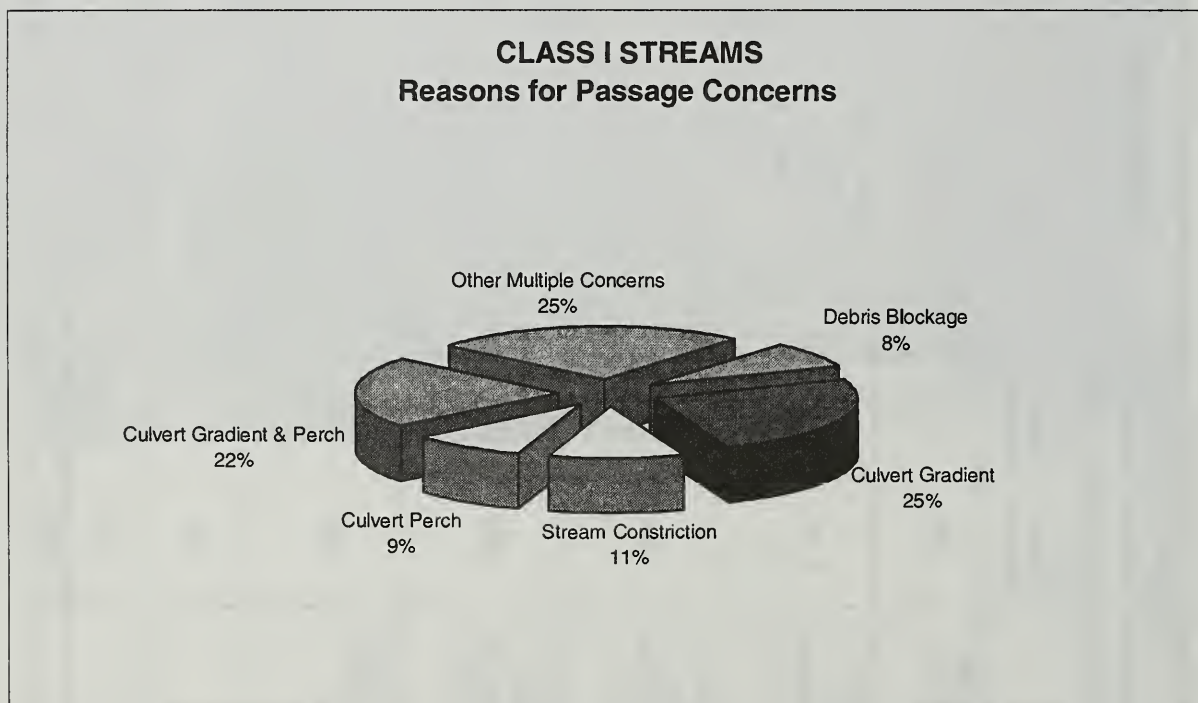


Figure 2.- Reasons why drainage structures in Class I streams are assumed not to provide upstream juvenile fish passage at the design flow standard.

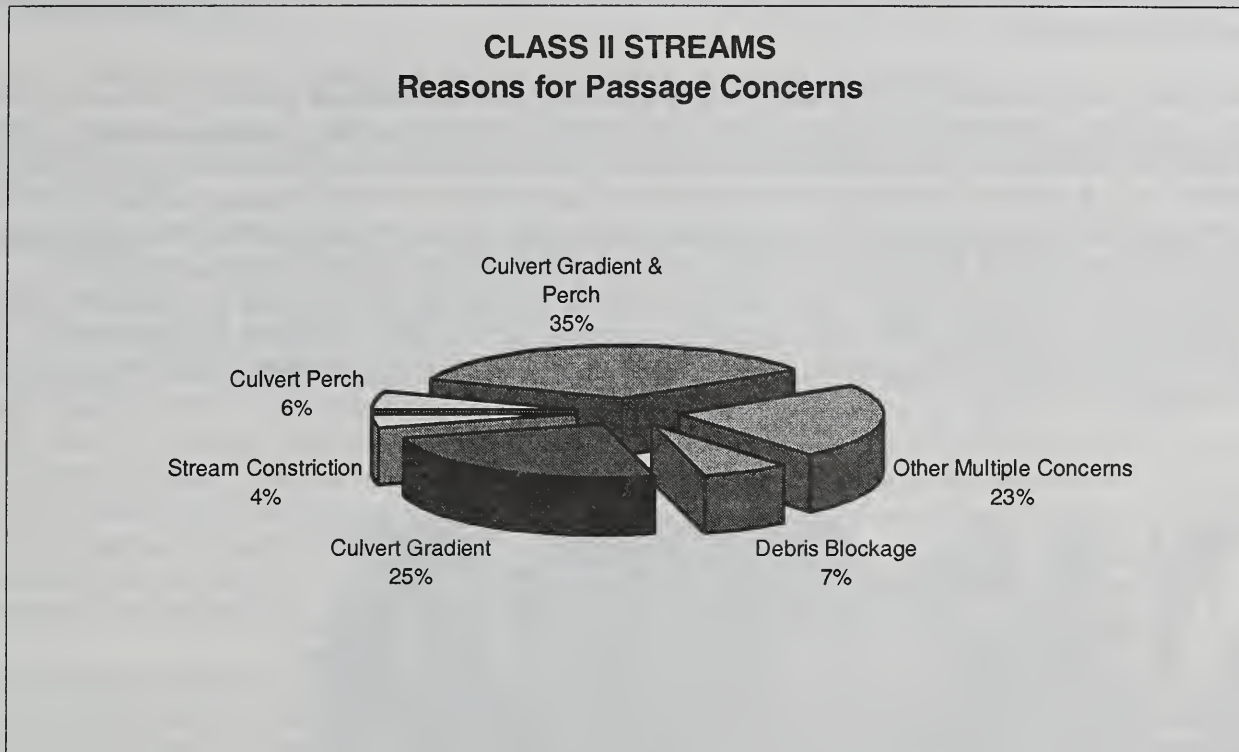


Figure 3.- Reasons why drainage structures in Class II streams are assumed not to provide upstream juvenile fish passage at the design flow standard.

Discussion

It is important to note that fish do pass through most of the culverts identified in the Red and Gray categories most of the year. Most of these culverts do have fish located upstream of them. We are only concerned that passage may not be possible for juvenile fish during the periods of high stream flow. The results provided are for juvenile fish passage, and it is likely that stronger swimming adult fish are not restricted in most of the structures. The drainage structures assessed in this report for their consistency with current juvenile fish passage standards include drainage structures installed at various times with various fish passage design standards. Therefore, the results should not be necessarily interpreted to conclude that the reason for a specific structure not meeting current standards is due to negligent structure design or intention. This report is not an evaluation of the current management of the Tongass National Forest. It does not assess the effectiveness of the current TLMP standards and guidelines. It does provide a baseline of current but preliminary fish passage conditions that can be used to track the commitment and progress toward maintaining, restoring or improving the opportunities for fish migration on the Tongass National Forest.

There is currently an initiative toward maintaining, restoring and improving fish passage along Tongass National Forest roads. The initial inventory and survey of all fish streams and their fish passage conditions along Tongass National Forest roads is nearing completion. Through the cooperation of an interagency group, a state-of-the-art fish passage assessment model has been developed and is being continuously improved. Improved standards for drainage structure design in fish streams are being developed. Study plans to better understand fish migration needs are being drafted. There is currently substantial funding available to correct fish passage problems identified through the survey and analysis process. During the 1999 fiscal year there were approximately ten fish passage remediation contracts either completed or awarded on the Tongass National Forest. As an example, a contract awarded on the Petersburg Ranger District will correct fish passage problems at six culvert locations. Four of the culverts

will be redesigned and reinstalled, while the other two will have the natural stream bed re-established by removing the culverts.

In the coming years, additional information will be gathered on the quantity and quality of the fish habitat located upstream of drainage structures which are currently identified as fish passage concerns. With this additional information, a prioritization schedule for corrective action and feasibility analyses will be completed. It is a realistic expectation that in the near future most of the fish passage concerns on Class I streams and the lower gradient Class II streams will be resolved by providing corrective actions. It is believed that many of the structures in Class II streams which are assumed to restrict juvenile fish passage at design flows have very small amounts of poor fish habitat located upstream of them. It is anticipated that the fisheries resource concerns on many of these Class II streams will be resolved through an interagency review process based on a site-specific feasibility analysis that compares project cost with fisheries values.



Heritage Resources

Goal: Identify, evaluate, preserve, protect, and enhance heritage resources.

Objective: Protect heritage resources (as described in the Heritage Resources Forest-wide Standards and Guidelines).

Background: The Forest Plan provides guidance on maintaining a heritage resource management program that identifies, evaluates, preserves, and protects significant heritage resources. This guidance applies Forest-wide and on a project-specific basis pursuant to the National Historic Preservation Act (NHPA), as amended, as well as other relevant acts and implementing regulations (for example, the Archaeological Resources Protection Act and the Native American Graves Protection and Repatriation Act). Section 106 of the NHPA requires that the Forest Service take into account the effect an "undertaking" (project, activity or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency) may have on heritage resources eligible for, or listed on, the National Register of Historic Places (National Register). When it is deemed necessary to complete a heritage resource survey for an undertaking, previously identified heritage resources within the project area are monitored for condition status. Section 110 of the NHPA requires a Federal agency to inventory, protect, use, and interpret all heritage resources eligible for, or listed on, the National Register.

The Alaska Region has a Programmatic Agreement (PA) with the Advisory Council on Historic Preservation and the Alaska State Historic Preservation Officer. The PA formalizes our compliance with Section 106 of the NHPA and implements monitoring Standards. These Standards call for monitoring of project areas either during or after project implementation to judge the effectiveness of current models that predict the heritage resource sensitivity of any given area of the forest.

The Forest Plan heritage resources Standards and Guidelines address:

- project clearance/inventory;
- project implementation;
- mitigation; and
- enhancement.

Heritage Resources Question 1: Are Heritage Resources Standards and Guidelines being implemented?

The Forest Plan Standards and Guidelines are being implemented.

Monitoring Results

We evaluated 80 undertakings in fiscal year 1999 for their potential to affect heritage resources eligible to the National Register. Qualified heritage resource specialists supervised all project evaluations and inventories. Forest Service archaeologists supervised most of these projects, while qualified contractors completed the remaining projects. Contract archaeologists are currently completing two Wrangell Ranger District projects. We have no evidence that sites are being damaged during contemporary project implementation.

The FY1999 results of the implementation of the Standards and Guidelines for the Tongass National Forest are displayed as follows:

Table 10. 1999 Heritage Resource Project Evaluations

| Projects Reviewed | Projects Reviewed under Standard 36 CFR 800 | Projects Requiring Mitigation other than Avoidance | New Sites Located During Project Implementation | Site Enhancements |
|--------------------------|--|---|--|--------------------------|
| 80 | 11 | 0 | 0 | 3 |

Project Inventory/ Clearance: The standard consultation procedures outlined in 36 CFR 800 were followed for 11 undertakings prior to the signing of a NEPA decision memo. Consultation procedures that were modified in the agreement with the Alaska State Preservation Officer (SHPO) were followed for 68 projects.

Project Implementation: Qualified heritage resource specialists supervised all project evaluations and inventories. Forest Service archeologists supervised most of these projects, while qualified contractors completed the remaining projects. Contract archeologists are currently completing two Wrangell Ranger District projects.

All heritage resource reports state that, if an archaeological site is identified during project implementation, the work will stop in that area and the Area Archaeologist will be notified. No work shall proceed at this locality until the Area Archaeologist has completed necessary documentation and a clearance re-issued. During Forest project implementation in fiscal year 1999, no sites were identified.

Mitigation: Avoidance of negative impacts is the preferred mitigation option for heritage resources on the Tongass National Forest. During fiscal year 1999, no projects required mitigation other than avoidance. The Tongass National Forest adhered to provisions of the Native Graves Protection and Repatriation Act (NAGPRA) that deal with intentional excavation and unintentional discovery of human remains.

Enhancement: Enhancement activities are monitored to determine whether significant sites are managed to take advantage of their recreational and educational potential, while protecting the values that make them significant. Enhancement activities are increasing across the Tongass National Forest. These activities include the *Passages* brochure, *The Bear Stands Up* video, Southeast Alaska Visitor Information Center displays and programs, the Forest Service Information center at the Centennial Hall in Juneau and the interpretative services program on the Alaska Marine Highway.

Additional enhancement projects included the following: Volunteers participated in five Passport-in-Time projects during the fiscal year. Tongass archaeologists made numerous classroom presentations throughout the school year. They provided projects in cooperation with the University of Alaska-Southeast and were a leading participant on the Coffman Cove Community Archaeology Project.

Stabilization and data recovery at three sites situated on eroding lake and coastal shorelines were accomplished in response to observed shoreline erosion of the past several years. Inspection of stabilization measures accomplished in FY1998 at an historic site indicates that these efforts have been successful in protecting the site from shoreline erosion and/or human degradation.

Evaluation of Results

The Forest Service Alaska Region has developed heritage resource management procedures to carry out its obligations under Sections 106 and 110 of the National Historic Preservation Act more efficiently and economically. These procedures are documented in Agreement #95 MOU-10-029, as amended, which was entered into by the Alaska Region, the Alaska State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

Archaeological inventory is based upon the likelihood of locating archeological and historic sites. Such likelihood is based upon the physical, biological, and cultural features and history of the area to be investigated. The Forest Service now recognizes two archeological sensitivity zones, high and low. The justification for this sensitivity zone model is provided in the MOU as Enclosure I, Predictive Modeling in the Alaska Region, USDA Forest Service: History and Current Status of the Sensitivity Zones. The sensitivity zones are subject to refinement as new information becomes available and the zones must be flexibly applied in the field. Archeological inventory for proposed activities is concentrated primarily in the high sensitivity zones. However, inventory is also conducted within areas of lower sensitivity. Post-project monitoring on roads and within other activity areas is accomplished to determine whether cultural manifestations were present but not identified by the previous inventory.

Post-project monitoring also provides information to test the predictive model. There is a need, however, to continue heritage resource monitoring to ensure that the Standards and Guidelines are continually met. We have in the past two years made significant progress in developing standardized monitoring procedures and in accomplishing a significant amount of monitoring inspections. However, we have only inspected a few of the total number of heritage resource sites on the Forest. Although the total numbers of damaged sites that have been stabilized are few, we are making efforts to repair damage. Additional stabilization, and/or data recovery efforts are limited by funding and personnel. The monitoring questions are relevant, and elicit information that is essential for monitoring Forest Plan objectives.

Heritage Resources Question 2: Are Heritage Resources Standards and Guidelines effective in protecting heritage/cultural resources as expected in the Forest Plan?

The Forest Plan Standards and Guidelines are effective in meeting resource objectives (i.e., site protection and preservation).

Monitoring Results

Project Implementation: Current evidence suggests that TLMP Standards and Guidelines are effective in protecting heritage resources. The Tongass National Forest has a strong record of compliance with Section 106 of the National Historic Preservation Act. During fiscal year 1999, Heritage Program staff evaluated 80 undertakings for their potential to affect heritage resources eligible to the National Register. Tongass archaeologists also examined 191 heritage resources for their condition status.

Avoidance of project impacts has been an effective mitigation approach. Non-project site monitoring is conducted through volunteer and educational programs, and also in conjunction with project work or other activities. The Tongass National Forest has a strong public outreach program that advocates an active stewardship ethic for forest visitors. The outreach program and other enhancement activities are perhaps our best tools in protecting heritage resources for future generations.

Project Inventory/ Clearance: Overall the Tongass National Forest meets our compliance requirements and completes archaeology work prior to making a NEPA decision for a project. We have developed an effective system to ensure that every undertaking is considered for its effects to heritage resources.

During fiscal year 1999, 191 heritage resource sites were monitored for condition assessment. Archaeologists noted accelerated erosion at 35 sites, and evidence of human caused damage at 19 sites. Four sites exhibited damage caused by previous Forest Service projects. The remaining 133 sites appear to be in a state of natural decomposition, with no evidence of accelerated natural erosion or human damage.

The results of the FY 1999 Tongass National Forest Heritage Program monitoring efforts are displayed as follows:

Table 11. 1999 Heritage Resource Projects Monitored

| Sites Monitored | Sites Eroding Normally | Sites with Accelerated Erosion | Sites Vandalized | Sites Damaged from Previous Forest Projects |
|------------------------|-------------------------------|---------------------------------------|-------------------------|--|
| 191 | 133 | 35 | 19 | 4 |

The statistical results of the FY 1999 monitoring program indicate that, of the 191 sites monitored, 70 percent are either undisturbed or deteriorating from normal erosional processes, while 18 percent of the sites are being impacted from accelerated erosion. Ten percent of the sites inspected were vandalized, and 2 percent of the sites were found to be damaged from previous Forest Service activities.

Mitigation: Site monitoring suggests project mitigation measures are effective in protecting heritage resources eligible to the National Register. The site monitoring is very detailed in some cases and specifically details how the site should be monitored for erosion and vandalism.

Enhancement: Evidence suggests that interpretative and educational programs were effective in strengthening the public's commitment to heritage resource preservation and protection. Public outreach leads to stewardship when the Forest visitor takes an active role in protecting sites. People protect what they understand and value. We reach thousands of people each year with the message that heritage resources are fragile, non-renewable and, if protected, can yield important historic information.

Evaluation of Results

The Forest Plan Standards and Guidelines are being implemented, and they do appear to be effective in meeting resource objectives such as site protection and preservation. There is a need, however, to continue heritage resource monitoring to ensure that the Standards and Guidelines are continually met. In the past two years we have made significant progress in developing standardized monitoring procedures and in accomplishing a significant amount of monitoring inspections. However, we have only inspected a few of the total number of heritage resource sites on the Forest. Although the total numbers of damaged sites, which have been stabilized, are few, we are making efforts to repair damage. The monitoring questions are relevant, and elicit information that is essential for monitoring Forest Plan objectives.



Karst and Caves

Goal: Maintain and protect significant karst and cave ecosystems Forest-wide.

Objectives: Allow for the continuation of natural karst processes. Maintain the productivity of the karst landscape, while providing for other land uses where appropriate.

Background: The Tongass National Forest contains the largest concentration of dissolution caves known in the State of Alaska. The Forest also contains world-class surface or epikarst features particularly in the alpine and sub-alpine zones. The caves and epikarst features result from chemical weathering of limestone and marble bedrock. The karst and cave features and associated resources are a recently discovered and recognized attribute of the lands within southeastern Alaska and have been found to be of national and international significance for a wide variety of reasons, including their intensity and diversity of development, the biological, mineralogical, cultural, and paleontological components, and recreational values.

The Federal Cave Resources Protection Act (FCRPA) is the primary U.S. law affecting caves. It requires protection of significant caves on Federal lands. A cave must possess one or more of the criteria outlined in 36 CFR Part 290.3 to be determined "significant". Though "non-significant" caves may exist, most meet the criteria for "significant". The intent of this act is to protect cave resources, not karst resources. However, it is important to recognize that caves and associated features and resources are an integral part of the karst landscape. Karst must be managed as an ecological unit to ensure protection of the cave resources.

Current projects with Records of Decision (RODs) signed after the TLMP Revision focus on karst area protection. New Forest-wide standards and guidelines require that areas of high vulnerability karst within the project area be deleted from land considered for harvest. Karst lands included in project areas are typically low or moderately low vulnerability karst. The new standards and guidelines will be implemented on the upcoming projects, such as Sea Level Timber Sale. Interim guidelines for karst and caves were implemented on the Heceta Sawfly Project, since the Record of Decision for this project was signed before the revised TLMP Record of Decision was signed. Heceta Sawfly had a NEPA decision that was in Category 1, Approved NEPA and Implemented Sale.

Karst and Cave Question 1: Are karst and cave standards and guidelines being implemented?

Monitoring was completed on projects falling under interim standards and guidelines for karst and caves, as well as on projects implemented under the direction of the standards and guidelines in the revised Forest Plan. Work completed under the revised Forest Plan karst and cave standards and guidelines included preliminary inventory, timber unit and road reconnaissance, timber unit layout, and road layout. The standards and guidelines were implemented to the fullest extent practical.

Implementation monitoring was completed on the projects listed below. Clarification of the status of the project implementation relative to the status of the standards and guides is outlined as follows: Heceta Sawfly Timber Sale timber harvest and road construction were implemented under the interim standards and guidelines. The Upper Carroll Timber Sale was implemented using the standards and guidelines in the revised Forest Plan, although this project was initiated prior to the Revised Forest Plan. Implementation of the standards and guidelines in the revised Forest Plan was applicable on the following projects: Cholmondeley, Moria, Sea Level, Luck, Staney, Otter Lake, Madden, Northwest Etolin Island, Gravina Island, Suemez Island, Tuxekan Island and Kosciusko Island EIS's. Monitoring of these efforts was completed.

Monitoring Results

The karst and cave Standards and Guidelines outlined in TLMP were implemented. Strictly speaking, the monitoring of the Heceta Sawfly Salvage Sale was not implementation monitoring for the revised Forest Plan.

Project under the interim Karst and Cave standards and guidelines

Heceta Sawfly Salvage Sale: In 1998, a re-evaluation of the application of the karst and cave standards and guidelines on the project resulted in a modification to the acreage of this timber sale after it was sold. Of the 511.7 acres of timber harvest planned, the evaluation identified 52.55 acres (10 percent) of the existing harvest units for deletion to fully meet the requirements of the interim standards and guidelines. To date, only the harvest units proposed for clearcut harvest (with the exception of Unit 17) have been felled and yarded. Approximately 235 acres of the sale have been harvested (8 harvest units). Monitoring focused on the implementation and effectiveness of yarding prescriptions, stabilization of cutslopes associated with roads, and windfirmness of harvest unit edges and the small buffers surrounding karst features.

Project implemented using the revised Forest Plan Karst and Cave Standards and Guidelines

Upper Carroll Timber Sale: Although this timber sale predates the revised TLMP karst and cave standards and guidelines, the sale was modified based on discovery of significant karst features during road construction and quarry development. A proposed road alignment was modified to avoid an area containing significant karst features that were not geologically mapped.

Projects under the revised Forest Plan Karst and Cave Standards and Guidelines

DEIS or FEIS input into Cholmondeley, Moria, Luck, Staney, Otter Lake, Madden, Gravina Island, Suemez Island, Tuxekan Island and Kosciusko Island Project Planning: Efforts were made to insure the karst and cave standards and guidelines were implemented in the planning of these projects. Implementation was completed through resource specialists' actions in the planning process, following discussions with contractors and review of their findings, design and analysis of dye trace programs, on-the-ground inventory, resource report writing, writing or review of resource sections of the DEIS or FEIS for the projects, and answering public comments. For instance, in reviewing public comment to the Luck Lake DEIS, discrepancies in the resource reports and inventory documentation prompted additional field survey that resulted in needed modification to proposed harvest units.

Sea Level Timber Sale: Revised Forest Plan standards and guidelines for karst were followed in the planning process and will be implemented during road construction and unit harvest. During harvest unit layout near Snipe Point on Thorne Arm, the unit design was modified to exclude an area of high vulnerability karst.

Northwest Etolin Island: Future timber harvest is planned in this area, and the extent of carbonate bedrock and karst development has been mapped. One cave found during previous harvest and subsequently buffered was visited to determine the effectiveness of the buffer. The buffer surrounding this cave has, for the most part, remained intact. Only limited blowdown has occurred. The continuous forest block to the south of the cave and the cave's position below the crest of a ridge have most likely contributed to the windfirmness of the buffer.

Evaluation of Results

Project under the interim Karst and Cave standards and guidelines

Heceta Sawfly Salvage Sale: The Heceta Sawfly Salvage Sale units are being felled and yarded as described above. Additional protection has been placed around several features not discovered during the original unit layout or the re-evaluation. This salvage harvest focused on feature protection. This

island is characterized by catastrophic windthrow events. The implementation of the karst standards and guidelines is dependent upon the effectiveness of the harvest and road construction.

The effectiveness of the yarding prescriptions was monitored. The yarding prescriptions were implemented, and the appropriateness of shovel yarding on portions of harvest units in areas of karst features was evaluated. It was found that shovel yarding across epikarst where soil development was limited resulted in the weight of the shovel crushing the epikarst fins that would interrupt the subsurface drainage of the epikarst. It was determined that shovel yarding in these areas was inappropriate, even with the shovel yarder running atop slash.

The effectiveness of road construction standards and associated seeding on the cut and fill slopes was also monitored. Though limited road construction across short expanses of high vulnerability karst is allowed under the current TLMP direction, it should be avoided if possible. If not possible, mitigation measures similar to those used in Unit 14 of the Heceta Sawfly Salvage Sale should be applied. It is imperative that same-season re-vegetation of the cut and fill slopes on roads constructed across moderate or high vulnerability areas be achieved. Road construction across moderate vulnerability karst is common.

During the next operating season, the purchaser will harvest the partial cut units that contain the majority of karst features. Monitoring efforts will be focused on the success of the prescriptions in those units and the windfirmness of the remaining forest and associated buffers. The few buffers surrounding isolated features in the clearcut units harvested in the 1999 field season had begun to blow down by the end of the season, as had the northern edge of Unit 4.

Projects under the Revised Forest Plan Karst and Cave Standards and Guidelines

DEIS's and FEIS's: Karst areas are included in the proposed harvest areas of the Cholmondeley, Moria, Sea Level, Luck, Staney, Otter Lake, Madden, Northwest Etolin Island, Gravina Island, Suemez Island, Tuxekan Island and Kosciusko Island projects. These areas were inventoried or are in the process of being inventoried, and the proposed unit pool modified to protect the karst and cave resources. Emphasis was placed on the protection of the function and integrity of the karst systems, rather than individual features.

The inventory showed that implementation of the karst and cave standards and guidelines outlined in the Forest Plan is being completed. It is essential to continue to train key personnel in the implementation of these protective measures. It is also essential that the Forest identify primary contacts for responsible specialists where karst resources are of concern.

An attempt was made to increase communication with our partners, the Glacier Grotto, Tongass Cave Project, and the caving volunteers. Agreements were developed between the Ketchikan, Thorne Bay, and Wrangell ranger districts to utilize the expertise of these skilled volunteers to help with evaluation of the resources. The Ketchicave Expedition on Kosciusko Island illustrated the potential benefit of our relationships. Ketchicave inventoried caves adjacent or within proposed harvest areas and completed underground mapping. Their findings were used to define areas of high vulnerability karst and to design dye traces to better define the karst hydrology of the Island.

In sensitive areas, resource inventories need to be conducted by a karst management specialist, ideally working in conjunction with soil scientists and hydrologists. Karst assessment requires specialized, professional skill and judgment.

It is imperative that vulnerability classification of karst lands be conducted before timber harvest is planned. The most sensitive areas or those of high vulnerability should be identified and removed from the suitable lands base before harvest units are proposed. At least two years are needed prior to project planning to identify karst hydrology of an area through dye tracing.

A Draft Tongass National Forest Land and Resource Plan Implementation Policy Clarification for Karst Management Standards and Guides is near completion. This draft document has been sent out for comment and peer review. This document should function as the implementation guide discussed in last year's monitoring report.



Karst and Caves Question 2: Are karst and cave standards and guidelines effective in protecting the integrity of significant caves and the karst resource?

Monitoring included only projects that followed interim standards and guidelines for karst and caves, since projects following the karst and cave standards and guidelines in the revised Forest Plan have not been implemented on the ground to date. The monitoring indicates that the interim standards and guidelines for system protection are effective. It is not possible to determine if the standards and guides for Karst and Caves in the revised Forest Plan are effective until projects are fully implemented and additional monitoring is completed.

The projects monitored included Heceta Sawfly, 89-94 units, and Upper Carroll Timber sale. Heceta Sawfly was a timber sale that implemented interim standards and guidelines prior to the implementation of the Revised Forest Plan. 89-94 Unit harvest was implemented under an earlier version of standards and guides prior to the Revised Forest Plan. The new standards and guides were implemented in the Upper Carroll Timber sale, although this project was initiated prior to the revised Forest Plan.

Heceta Sawfly was the only project monitored for compliance of the Standards and Guidelines. Since 89-94 unit offerings used measures similar to the Standards and Guidelines in the Revised Forest Plan, these units were monitored. Strictly speaking, since neither Heceta Sawfly nor 89-94 harvest units were implemented under the revised Forest Plan, the project monitoring conducted was not effectiveness monitoring of the Standards and Guidelines in the Revised Forest Plan.

Monitoring Results

The 1999 effectiveness monitoring focused on two areas:

Heceta Sawfly Salvage Sale: The Heceta Sawfly Salvage Sale units are in the process of being felled and yarded. Additional protection was placed around several features not discovered during the original unit layout. This salvage harvest focused on feature protection under interim standards and guidelines.

Approximately 250 acres of harvest atop karst were monitored after timber harvest and road construction took place in 1999. The majority of this harvest was associated with the Heceta Sawfly Salvage Sale. The effectiveness of yarding restrictions and buffer design were monitored. Prescriptions limiting use of shovel yarding on karst were developed based on field inspections within harvest units. The few buffers within the monitored units remained intact at the close of the 1999 season's harvest activities. These buffers will be monitored to measure effectiveness in the following years. High rainfall and strong winds during the fall of 1999 have already begun to windthrow timber primarily along the northern exposed margins of the recently harvested units.

89-94 Long Term Timber Sale: This timber sale was implemented prior to the interim or new Forest Plan karst and cave standards and guidelines. The units monitored were selected where buffers were prescribed to protect significant karst features found within the harvest units.

The 89-94 Long-term Timber Sale Units 532-109, 537-107, 537-108, 534-104, 534-110, 534-111, 539-101, 532-117, and 532-115 were monitored. A detailed report of each of these units is available upon request. A total of 14 buffers were monitored in the 9 harvest units listed above. Half of these buffers have failed at a rate of 50 to 90 percent. The other half failed at a rate of 10 to 30 percent. In summary, the following observations were made:

- The minimum 100-foot buffer designed to protect the integrity of a cave's entrance was not effective in most instances due to blow down. These buffers failed at a rate of 50 to 90 percent, wherever a natural muskeg/forest edge was not present and/or topography did not protect the buffer from wind.
- Most buffers were left along an edge of a harvest unit or as a freestanding block of forest within a harvest unit. The freestanding buffers have the highest rate of failure; southern and southeastern winds cause the most failure, and north winds contribute to the buffers' failure as well.

- In one case, the merchantable timber had been directionally felled from the buffer to reduce the windthrow risk. The non-merchantable timber blew down at a rate of 20 to 50 percent failure.
- Buffers with a natural muskeg/forested wetland margin remain intact for the most part. Only minor blowdown has occurred within these (less than 15 percent failure, with failure usually occurring along the edge).

Evaluation of Results

The karst and cave management standards and guidelines focusing on system protection were shown to be effective in protecting the integrity of significant caves and karst resources. Data is inclusive about the effectiveness of individual features.

While the revised Forest Plan standards for karst and cave resources were implemented in the Heceta Sawfly Project Area, they focused on feature protection and not system protection. Even though only the minimum standards required were implemented, the project offers a good opportunity to monitor the effectiveness of applied prescriptions and mitigation. As previously mentioned, the purchaser will harvest the partial cut units that contain the majority of karst features during the next operating season. Monitoring efforts will focus on the success of the prescriptions in those units and the windfirmness of the remaining forest and associated buffers.

Since the revised Forest Plan standards and guidelines have not been in place long enough to measure the long-term effectiveness of minimum 100-foot buffers to protect karst features, it was decided that the effectiveness of similar buffers prescribed in the 89-94 Long Term Timber Sale units should be monitored. The current standards call for a minimum of a 100-foot windfirm buffer to protect karst features and losing streams. When developed in 1993, this requirement was modeled after Tongass Timber Reform Act (TTRA) stream buffers. Rationale is that karst hydrologic systems are subsurface streams, and that features such as sinkholes, cave entrances, and collapse channels are surface expressions of underground streams.

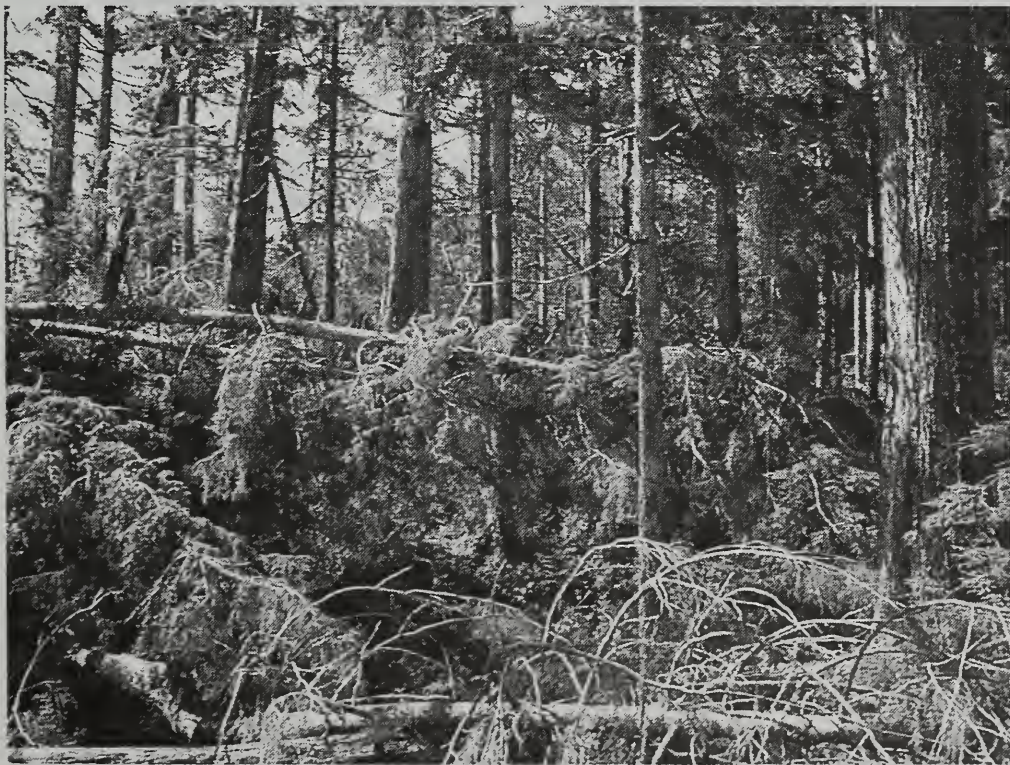
Based upon the 89-94 Long Term Timber Sale buffer monitoring, we recommend that specific standards and Guidelines that address isolated sideslope karst buffers need to be developed. Emphasis should include application of wind disturbance management techniques to design of the karst buffers. The karst buffers should be designed with methodology similar to the riparian buffers, such as the two site potential height of the no harvest zone criteria. The karst buffer designs and monitoring should emphasize:

- Minimum 100 foot no harvest beyond the edge of a losing stream;
- Assurance of windfirmness of the buffer zone;
- Conducting windthrow risk assessments in the area surrounding the buffer;
- Windthrow predictability models such as the model developed by Nowacki and Kramer, 1998 (PNW GTR 421, April 1998);
- "Feathering" or "scalloping" the edge of a harvest unit to enhance windfirmness; and
- Additional monitoring should focus on the isolated sideslope buffers, windthrow, effects of feathering or scalloping the harvest unit edge.

Riparian buffer monitoring data should be reviewed and used to increase the sample set of buffers monitored. Layout techniques, post-TLMP ROD planning efforts and inventory work completed on new sales (i.e. Madden, Kosciusko) should be evaluated prior to making recommendations about the buffer specifications.

Pre-harvest monitoring of caves is significant to determine baseline data on sediment, flow, and windthrow. Pre-harvest monitoring of caves associated with the Kosciusko Island planning effort were conducted. Approximately 50 caves were inventoried and mapped within or adjacent to proposed timber harvest areas. A final report of the last two seasons' mapping and inventory efforts is pending. The results of this inventory are being incorporated into the project planning record. Pre-harvest monitoring of

caves and karst systems was also conducted on northeastern Etolin Island and within the Madden Project Area.



Land Management Planning

Background: The Forest Service policy and direction for improvement of government-to-government relationships, and collaborative, community-based resource stewardship establishes a goal of compatibility of Forest Service management activities with the goals and objectives of adjacent lands. In addition, 36 CFR [219.7(f)] requires that a program of monitoring and evaluation shall be conducted that includes the effects of National Forest management on lands, resources, and communities adjacent to or near the National Forest project or activity being planned. Effects upon National Forest land from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments will also be monitored and evaluated.

Land Management Question: Is the management of National Forest System lands consistent with management objectives of adjacent lands and their management plans?

Monitoring Results

National Forest Management projects with decisions completed in fiscal year 1999 have been evaluated to determine if any non-National Forest lands are adjacent to the project location. Projects that have been appealed, and decisions remanded during the 1999 fiscal year were not evaluated.

The projects identified as having adjacent non-National Forest system lands are listed below, along with details on the type of project, management objective, and consistency determination between the management objectives on the FS land and adjacent lands. Lands identified as being adjacent are within a distance that could possibly be influenced by the project.

Admiralty National Monument

Greens Creek Mine: This project is located at Admiralty National Monument. Kennecott Greens Creek Mining Company (KGCMC) intends to drill on a maximum of 18 drill pads located over nine areas.

Non-National Forest Lands: Seven of these areas are located on lands for which Greens Creek acquired the subsurface rights through the Greens Creek Land Exchange. Two areas are located outside of Admiralty National Monument on unpatented mining claims south of Young Bay. There are no management activities adjacent to these non-National Forest lands that are inconsistent with the management activities of the non-National Forest lands. This project is fully consistent with the management of adjacent non-National Forest lands.

Craig Ranger District

Niblack Lakes and Streams TLMP Amendment: Niblack Lake and Stream is located on southeast Prince of Wales Island. The project was a non-significant Forest Plan amendment to correct a Wild River Land Use Designation. The lands located within the river corridor were changed from the Wild River Land Use Designation to the same land use designations that are adjacent to the river corridor. This includes Timber Production, Old Growth Habitat, and Minerals Land Use Designations.

Non-National Forest Lands: Adjacent non-National Forest lands are mining claims. The Niblack Lake and Stream system has been made fully consistent with the management objective of adjacent lands and their management plans.

Ketchikan/ Misty Ranger District

Sea Level Timber Sale: The Sea Level Project Area contains 91,747 acres of National Forest System lands and is located approximately 18 air miles east of Ketchikan, Alaska on South Central Revillagigedo Island. This Project authorizes the harvest of 47 MMBF of sawlog and utility volume and 4 MMBF of right-of-way volume, for a total of 51 MMBF. Lands located within the study area with management activities

include Timber Production, Old-growth Habitat, Modified Landscape, Semi-remote Recreation, and Scenic Viewshed LUDs, and non-National Forest lands.

Non-National Forest Lands: This project is adjacent to lands belonging to the State of Alaska and private land owners. There are no management activities adjacent to these non-National Forest lands that are inconsistent with the management activities of the non-National Forest lands. This project is fully consistent with the management of adjacent non-National Forest lands.

Petersburg Ranger District

Crystal Creek Timber Harvest FEIS: Located on the mainland south of Thomas Bay, the project authorizes the harvest of 16 MMBF of timber, construction and reconstruction of associated road systems, reconstruction of the Thomas Bay LTF, building a shelter and trail to Ess Lake, and completing watershed restoration on the Muddy River. Lands located within the study area with management activities include Timber Production, Old-growth Habitat, Special Interest Area, Modified Landscape, and Scenic Viewshed LUDs, and non-National Forest lands.

Non-National Forest Lands: This project is adjacent to lands belonging to the State of Alaska and private landowners. There are no management activities adjacent to these non-National Forest lands that are inconsistent with the management activities. This project is fully consistent with the management of adjacent non-National Forest lands.

Wrangell Ranger District

Stikine River Delta Goose Study: This project is located at the Stikine River Delta, Sergief and Farm Island. It authorizes the evaluation of the use of the Stikine River Delta by snow geese during their spring migration, and their feeding on wetland plant communities. Lands for this project are part of the Stikine Laconte Wilderness.

Non-National Forest Lands: This project is adjacent to lands belonging to the State of Alaska. There are no management activities adjacent to these non-National Forest lands that are inconsistent with the management activities. This project is fully consistent with the management of adjacent non-National Forest lands.

Wrangell Ranger District Office and Parking Expansion: This project is located at the Wrangell Ranger District compound, City of Wrangell, Wrangell Island. The project authorizes construction of additional office space and parking at the Wrangell Ranger District Compound. The compound belongs to the Forest Service.

Non-National Forest Lands: This project is adjacent to lands belonging to the City of Wrangell. This project is fully consistent with the management of adjacent non-National Forest lands.

Yakutat Ranger District

Summit Lake to Aka Lake Stream Channel Excavation: Located on a small stream between Summit Lake and Aka Lake approximately three miles southwest of the City of Yakutat, Alaska, this project was for the excavation of approximately 215 meters of streambed using hand tools to create deeper areas that will not dewater during low precipitation times. Lands located within the area with management activities include Scenic Viewshed LUD.

Non-National Forest Lands: The stream to be excavated passes through a pending private allotment. The private owners had no opposition to this project. This project is fully consistent with the management of adjacent non-National Forest lands.

Construction of 10-Mile ATV Trail: The trailhead is located near mile 10 on Forest Highway 10, near Yakutat, Alaska. This project was planned to construct and maintain a 1.16-mile all terrain vehicle trail to

the Middle Situk public use cabins. Lands located within the area with management activities include Scenic Viewshed, and Semi-Remote Recreation LUDs.

Non-National Forest Lands: Sealaska Corporation has selected land within the area of this project, which has yet to be conveyed, and has concurred with this project. The project is fully consistent with the management of adjacent non-National Forest lands.

Construction of the Situk River Trail: Located near Yakutat, Alaska, this project would construct and maintain a 0.6-mile foot trail around the west and north sides of the Maggie John Allotment. This trail replaces an existing trail that goes through the Maggie John Allotment. Lands located within the area with management activities include Remote Recreation LUD.

Non-National Forest Lands: This project replaces and is adjacent to a trail that goes through the Maggie John Allotment. The trail will be designed to be non-motorized, and it will be constructed so that motor vehicle use will be very difficult if not impossible. Further, there is a regulation in place that restricts motor vehicles to roads in the area. The trail has been located so as to direct traffic around, not across, private land. This project is fully consistent with the management of adjacent non-National Forest lands.

Monitoring Evaluation

There were no projects that were inconsistent with non-National Forest land during 1999. This has been the trend for the past two years.

Local and Regional Economics

Goal: Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska.

Objective: Work with local communities to identify rural community assistance opportunities and provide technical assistance in their implementation. Support a wide range of natural resource employment opportunities within Southeast Alaska's communities.

Background: The Tongass National Forest comprises about 90 percent of Southeast Alaska's total land base. The 33 communities within Southeast Alaska use and depend on Forest resources for economic opportunities, quality of life, traditions and cultures, and recreation activities. Forest management decisions can have significant impacts, positive and negative, on these communities.

Question 1: Are the effects on employment and income similar to those estimated in the Forest Plan?

Data Collection: Annually summarize estimates of the natural resource employment and income estimates from the Alaska Department of Labor employment and earnings data. Compare these annual estimates with those estimated in the Forest Plan.

Evaluation Criteria: Effects of Forest Plan implementation on employment and income by resource sector.

Precision and Reliability: Employment and income statistics for resource industries are difficult to collect for several reasons. Alaska Department of Labor employment and earnings statistics do not include self-employed persons. Most commercial fishers, many loggers, and tourism-related operations are not reflected in State data. The US Bureau of Economic Analysis income and employment data does include self-employed persons, but it is not reported in the detail necessary to break out each resource-industry. In addition, State disclosure laws relating to income prevent the Alaska Department of Labor from releasing detailed figures, resulting in several gaps in the analysis.

Employment and earnings data is collected and reported by industry sectors. Every business operation has an assigned industry code for which data is reported to the State. In the case of Recreation and Tourism, no single industry code exists, but it is made up of many different services and retail trade operations. The amount of business activity directly related to recreation and tourism activity is not easily available from the reported data. Recreation and Tourism figures for Forest Plan analysis were estimated using non-agriculture wage and salary employment data (not inclusive of self-employed), IMPLAN modeling output, and survey data. The data presented for this monitoring report are not directly comparable to the estimates in the Forest Plan, but are included for general trend analysis of the industry.

A similar situation exists with commercial fishers. Because most of them are self-employed, their earnings are not reflected in State data reports. The Forest Plan assumed any significant impacts to salmon fisheries would not be related to Forest management activities (see the 1997 TLMP FEIS, page 3-491). The employment and earnings data for seafood processing has been presented as an analysis of general trends in the commercial fisheries industry rather than a direct comparison of Forest Plan estimates.

Monitoring Results

Monitoring results are shown in the following tabular Forest Plan estimates and the Alaska Department of Labor employment and earnings data.

Analysis: Describe and explain the difference between the Forest Plan estimates and actual employment and earnings data.

Table 12 – Forest Plan Employment and Earnings, Annual Equivalent ¹

| Employment Sector | ASQ | | NIC 1 | |
|--------------------------------|--------|------------------------|--------|------------------------|
| | Jobs | Earnings (\$ millions) | Jobs | Earnings (\$ millions) |
| Wood Products | 1,010 | 45 | 891 | 40 |
| Recreation/Tourism | 3,698 | 117 | 3,698 | 117 |
| Salmon Harvesting ² | -- | -- | -- | -- |
| Mining | 810 | 49 | 810 | 49 |
| Southeast Alaska Total | 40,660 | 1,278 | 40,350 | 1,268 |

1. Forest Plan estimates have been adjusted for changes made in the 1999 TLMP Record of Decision.

2. The Forest Plan did not measure impacts to Salmon Harvesting or Seafood Processing because much of the changes in the industry are not influenced by Forest Service activity; see 1997 TLMP FEIS pages 3-491 for details.

Table 13 – Southeast Alaska Employment and Earnings, Annual Equivalent (Non-agriculture Wage and Salary [NAWS] Employment and Earnings¹)

| Employment Sector | Jobs/ Earnings (\$ millions), Years 1995 - 1998 | | | |
|----------------------------------|---|--------|--------|--------|
| | 1995 | 1996 | 1997 | 1998 |
| Wood Products | 2,069 | 1,740 | 1,456 | 1,221 |
| | 95 | 79 | 75 | 57 |
| Retail and Services ² | 12,594 | 12,702 | 12,830 | 13,006 |
| | 242 | 252 | 254 | 263 |
| Seafood Processing ³ | 1,587 | 1,326 | 1,444 | 1,289 |
| | 40 | 36 | 34 | 33 |
| Mining | 189 | 273 | 331 | 337 |
| | 12 | 18 | 22 | 23 |
| Southeast Alaska Total | 35,452 | 35,643 | 35,571 | 34,954 |
| | 1,083 | 1,077 | 1,080 | 1,071 |

1. NAWS data includes all full- and part-time wage and salary employment; this does not include any self-employed persons.

2. Retail and Services includes all employment and earnings in these sectors, not just those associated with Recreation and Tourism. This category is used to present general trends of the sectors rather than direct comparisons.

3. Seafood Processing is presented to highlight general trends of the commercial fishing industry rather than direct comparisons with the Forest Plan. Salmon Harvesting data is not available because the majority of commercial fishers are self-employed and their earnings are not counted by the Alaska Department of Labor.

Wood Products: The Forest Plan employment and earnings figures include activities associated with private, State, BIA, Forest Service, and Native Corporation timber harvesting. The figures associated with the Forest Plan in Table 12 have been adjusted for the 1999 TLMP Record of Decision, which changed the ASQ to 187 and the NIC 1 component to 153 MMBF.

Comparing actual employment and Forest Plan estimates is difficult at this time, since the numbers in the Forest Plan are based on the 1999 TLMP ROD. The most current employment figures from the Alaska Department of Labor for 1998 do not reflect the industry operating under the 1999 ROD. The employment figures do show a downward trend due to mill closures and the reduced ASQ of the TLMP

Record of Decision signed in 1997. It is likely employment will continue to decline toward the Forest Plan estimates in the next few years.

Recreation and Tourism: The recreation and tourism estimate in the Forest Plan, as explained above, was not recalculated for this analysis; instead, employment and earning figures for the Retail and Service sectors are used as a proxy of general trends. The Forest Plan estimate includes an estimate of self-employment and assumes full implementation, with all opportunities for recreation and tourism being fully developed. The employment and earnings data from the State do indicate an increasing trend in those sectors associated with tourism and recreation activities. Information more directly related to trends in the tourism industry is displayed under the Recreation and Tourism monitoring section of this report.

Commercial Fishing: Because State data do not include self-employed commercial fishing activity, seafood-processing levels have been presented as a proxy for the general trends in the Fisheries industry. Trends are more reflective of global market conditions than Forest management activities.

Mining: The large difference in employment and earnings between the Forest Plan's levels and 1998 levels can be explained in terms of implementation. The estimates for the Forest Plan assume full implementation of all potential mining sites during the life of the plan. In reality, only profitable mining sites are likely to be opened. If gold prices do not increase significantly, it is unlikely that the mining industry will reach employment levels estimated in the Forest Plan.

Regional: Overall, Forest Plan estimates are higher than State data, and it appears the State total employment is declining. Forest Plan figures include an estimate of self-employed persons and assume full implementation over the life of the Plan, which accounts for some of the difference. Recent declines in the wood products industry and commercial fishing account for over 60 percent of the total employment declines in Southeast employment.

Wages: Wage estimates used in the Forest Plan were based on past wages and input/output modeling. Forest Plan wage estimates and actual wages reported by the Alaska Department of Labor (Table 14 below) are in nominal dollars. Forest Plan estimates for both wood products and mining are lower than actual wages reported by the State.

Table 14 – Southeast Alaska Annual Average Wages, nominal dollars.

| Forest Plan | | NAWS, Alaska Department of Labor ¹ Earnings in Years 1995 - 1998 | | | | |
|--------------------------------|----------|--|----------|----------|-----------------------|----------|
| | | | 1995 | 1996 | 1997 | 1998 |
| Wood Products | \$44,542 | Wood Products | \$45,839 | \$45,228 | \$51,751 ² | \$47,043 |
| Recreation/Tourism | 31,773 | Retail ³ | 17,584 | 18,345 | 18,045 | 18,459 |
| | | Services ³ | 20,707 | 21,277 | 21,325 | 21,568 |
| Salmon Harvesting ⁴ | 26,418 | | | | | |
| Seafood Processing | 26,074 | Seafood Processing | 25,379 | 26,987 | 23,724 | 25,288 |
| Mining | 60,971 | Mining | 62,825 | 67,128 | 65,729 | 69,214 |
| Southeast Alaska | 30,914 | Southeast Alaska | 30,547 | 30,223 | 30,359 | 30,630 |

1. NAWS = Non-Agriculture Wage and Salary Earnings. This data includes all full- and part-time wage and salary employment; this does not include any self-employed persons.

2. Earnings for this year appear to include a large amount of severance pay associated with mill closures.

3. The Retail and Service sectors include more than recreation and tourism related activity. These sectors are provided to highlight general trends rather than direct comparisons.

4. Salmon Harvesting is not included in the Alaska Department of Labor data because the majority of commercial fishers are self-employed and their earnings are not counted in NAWS data.

Recreation and Tourism estimates are significantly higher than wages reported by the State for the Retail and Services sectors. This difference is related to the assumption of full implementation of the Forest Plan, in which case all recreation and tourism opportunities would be used to provide employment and income in the future. The general increases in wages of the Retail and Services sector support the higher estimate, but it is unlikely average Retail and Service wages will increase to the estimated level over the life of the plan.

Seafood Processing estimated wages are higher than 1998 State report wages, but are lower than 1996. This is likely reflective of a highly variable industry that is more influenced by global markets and ocean conditions than Forest management activities.

Overall, the estimated average annual wage is somewhat higher than the wages reported by the State, but the regional trend indicates a decline in 1996, with some recovery in 1997 and 1998. This could be due to a combination of poor commercial fish markets, decline in the wood products industry – which is associated with high pay jobs, and an increase in the Retail and Service sectors – which are associated with lower paying jobs.

Wages: Wage estimates used in the Forest Plan were based on past wages and input/output modeling. When compared to the past three years, Forest Plan estimates for wood products and mining are lower than actual wages reported by the State.

Recreation and tourism estimates are significantly higher than wages reported by the State for the Retail and Services sectors. This difference is due to the assumption of full implementation of the Forest Plan, in which case all recreation and tourism opportunities would be used to provide employment and income in the future. The general increases in wages of the Retail and Services sector support the higher estimate and the tourism industry growth trend.

Seafood Processing estimated wages are higher than State-reported wages in 1995 and 1997, but are lower than 1996. This likely reflects a highly variable industry that is more influenced by global markets and ocean conditions than Forest management activities.

Overall, the estimated average annual wage is somewhat higher than the wages reported by the State, but the regional trend indicates a decline in 1996, with some recovery in 1997. This could be due to a combination of poor commercial fish markets, decline in the wood products industry (and associated high paying jobs), and an increase in the Retail and Service sectors (and associated lower paying jobs). This is also supported when comparing State data to US Bureau of Economic Analysis data to account for self-employment. While the total number of self-employed people is increasing, their annual average wage is about \$1,500 less than NAWS wages.

Evaluation of Results

The monitoring results are inconclusive at this time. We need to continue monitoring the situation.

Local and Regional Economics Question 2: Has the Forest Service worked with the local communities to identify and pursue Rural Community Assistance opportunities?

Background: The Rural Community Assistance (RCA) Program is a Forest Service program consisting of two parts: the Economic Recovery Program (ERP) and the Rural Development (RD) program. The RCA Program also indirectly includes participation in the Southeast Alaska Community Economic Revitalization Team (SEA-CERT).

Economic Recovery Program: The Forest Service notifies rural communities in or near the national forests of the program, and responds to requests for assistance from communities. The program has grants that are available to (a) organize community action teams, (b) develop community action plans, and (c) implement projects from the community action plan. Grants are competitive, and contingent on annual appropriations.

Rural Development Program: The Forest Service has entered into a cooperative agreement with the State of Alaska to provide this funding through the State's Community Development Block Grant (CDBG) mini-grant program. The program provides seed money for community projects statewide that will produce long-term jobs in the communities.

Southeast Alaska Community Economic Revitalization Team: SEA-CERT is a Federal-State partnership organized to help communities maintain, strengthen or diversify their economies by providing improved access to technical, permitting and financial assistance. The Tongass National Forest Supervisor shares the Federal co-chair seat with the State Director of USDA Rural Development. The Commissioner of the Alaska Department of Community and Regional Affairs occupies the State co-chair seat. The three Tongass NF RCA coordinators provide staff support to the SEA-CERT.

Monitoring and Evaluation of Results

Effects of the RCA program: The community level effects of the RCA program are noted in Table 15. The effect of the SEA-CERT program has been to improve communication, coordination, and collaboration between State and Federal agencies on behalf of participating communities. The Forest staff readily works with communities who desire assistance. Some ranger districts have increased collaborative stewardship efforts that often lead to identification and pursuit of RCA opportunities.

The Forest Service has worked with the local communities to identify and pursue Rural Community Assistance opportunities. Monitoring levels are fully adequate.

Table 15 Rural Community Assistance Activities and Effects

| Community Name | Ranger District | RCA Activity (Yes / No) | Comment (Effect) |
|------------------------------------|------------------------|--------------------------------|---|
| 1. City of Angoon | ANM | Y | Assistance in community tourism planning. Distributed FY1999 Economic Disaster funds to community. |
| 2. City of Hydaburg | CRD | Y | Assisted Community Action Team re-start to develop Community Action Plan. Distributed FY1999 Economic Disaster funds to community. |
| 3. City of Craig | CRD | Y | Co-funded Klawock Sockeye Conference with Collaborative Stewardship (ERP) grant. Distributed FY1999 Economic Disaster funds to community. |
| 4. City of Klawock | CRD | Y | Scoped boat harbor project received through SEA-CERT. Distributed FY1999 Economic Disaster funds to community. |
| 5. Hollis Community Council | CRD | N | |
| 6. City of Hoonah | HRD | Y | Assisted with the architectural design and engineering study for a city park. Distributed FY1999 Economic Disaster funds to community. |
| 7. City of Pelican | HRD | Y | Organized action team and worked on developing an action plan. Distributed FY1999 Economic Disaster funds to community. |
| 8. City of Tenakee Springs | HRD | Y | Created brochure to promote City; develop retreat and seminar bureau. Distributed FY1999 Economic Disaster funds to community. |
| 9. City and Borough of Juneau | JRD | Y | Distributed FY1999 Economic Disaster funds to community. |
| 10. Borough of Haines | JRD | Y | Assistance in creating a small business resource center. Distributed FY1999 Economic Disaster funds to community. |
| 11. City of Haines | JRD | N | |
| 12. City of Skagway | JRD | Y | Distributed FY1999 Economic Disaster funds to community. |
| 13. Gustavus Community Association | JRD | N | |
| 14. Ketchikan Gateway Borough | K/MRD | Y | Ranger serves on OEDP committee; RD collaborating with Borough and other owners on Gravina Island management planning activities. Distributed FY1999 Economic Disaster funds to community. Transferred Veneer Feasibility Study funding to community. Adjusted Ketchikan Pulp Company contract term to increase the viability of the new veneer plant. |
| 15. City of Ketchikan | K/MRD | Y | Ranger District continues to work with the City on 6 power projects. |
| 16. Metlakatla Indian Community | K/MRD | Y | Alaska Fisheries Development Foundation submitted a report / proposal regarding economic development potential on Annette Island. FS staff was in Metlakatla often, coordinating with Mayor and council members on NF management projects. Planned Youth Practicum for delivery in Metlakatla. Distributed FY1999 Economic Disaster funds to community. |

Table 15 Rural Community Assistance Activities and Effects, cont.

| | | | |
|---|-------|---|--|
| 17. City of Saxman | K/MRD | Y | ERP grant used for audit of permitted business; made final payment; closed grant file; no further activity. |
| 18. Hyder Community Association (HCA) | K/MRD | Y | Coordinated closely with the Community on the re-design and development of the FS bear-viewing facilities and associated transportation facilities. Worked cooperatively with HCA and BC Forest Service to distribute a driving tour guide to nearby points of interest. |
| 19. City of Petersburg | PRD | Y | Continued work on ERP-funded site development for park in low income housing area. Provided facilitation for community response to SE Transportation Plan. Provided TA to City for recreational boardwalk planning. Assisting with Totem project development. Distributed FY1999 Economic Disaster funds to community. |
| 20. City of Kupreanof | PRD | N | |
| 21. City of Kake | PRD | Y | Preliminary discussions on provision of TA for trail development around Historic Cannery. Extensive cooperation and partnership with Federal agencies on conversion of Forest road to State roads and upgrading community float dock for community access. Distributed FY1999 Economic Disaster funds to community. |
| 22. City and Borough of Sitka | SRD | Y | Assistance in community collaboration and convention marketing. Distributed FY1999 Economic Disaster funds to community. |
| 23. City of Port Alexander | SRD | Y | Completed trail restoration work on Cape Decision Lighthouse with Chief's funding. |
| 24. City of Kasaan | TBRD | Y | Awarded ERP grant for community ambulance. Distributed FY1999 Economic Disaster funds to community. |
| 25. City of Thorne Bay | TBRD | Y | Additional work on Ron's Road / Harbor Road (Spirit Award). Supported facilitator for community meetings on encumbered lands w/ Collaborative Stewardship grant. Continued North Prince of Wales Island Collaborative Stewardship meetings w/ facilitator. Distributed FY1999 Economic Disaster funds to community. |
| 26. City of Coffman Cove | TBRD | Y | Scoped Bulk Fuel Storage and Boat Launch Float projects received through SEA-CERT. Awarded Collaborative Stewardship grant (ERP) for archaeology project in community. Awarded grant (Spirit Award) for fish-cleaning station as part of harbor expansion. Distributed FY1999 Economic Disaster funds to community. |
| 27. Naukati West Homeowners Association, Inc. | TBRD | Y | NWI completed Waterfront Development Master Plan w/ ERP grant; worked w/ community and others on interim boat and float plane facilities and waterfront access. |
| 28. Whale Pass Homeowners' Association | TBRD | Y | Community continued needed road work with ERP grant. |
| 29. Port Protection Community Association | TBRD | Y | Assisted entrepreneur with development plans for an accessible fishing lodge. |

Table 15 Rural Community Assistance Activities and Effects, cont.

| | | | |
|--|------|---|---|
| 30. Point Baker Community Association | TBRD | N | |
| 31. Edna Bay Homeowners' Association | TBRD | N | |
| 32. City of Wrangell | WRD | Y | Previous ERP grants continue to fund Small Business Development seminars. FY99 funds are assisting the development of a downtown revitalization plan and marketing for the new museum and civic center. A collaborative approach was taken in the Wrangell Island Analysis, TA provided for spur road location, Corps permit applications, and Garnet Festival activities. Distributed FY1999 Economic Disaster funds to community. |
| 33. Thoms Place Community Association | WRD | Y | Completion of a community action plan. |
| 34. City and Borough of Yakutat | YRD | Y | Assisted in development of a community cultural center/museum and assist with trustee board development. Distributed FY1999 Economic Disaster funds to community. |
| 35. Southeast Conference | TNF | Y | Previous year ERP funds continue to support development of SE Alaska Overall Economic Development Plan for submission to US Dept. of Commerce, Economic Development Administration in support of proposed designation of SE Alaska as an Economic Development District. |

Minerals and Geology

Goals: Provide for environmentally sound mineral exploration, development, and reclamation in areas open to mineral entry and in areas with valid existing rights that are otherwise closed to mineral entry. Encourage prospecting, exploration, development, mining, and processing of locatable minerals in areas with the highest potential for mineral development. Ensure that minerals are developed in an environmentally sensitive manner, and that other high-valued resources are considered when mineral developments occur. Seek withdrawal from mineral entry of specific locations where mineral development may not meet Land Use Designation (LUD) objectives.

Objective: Implement the Minerals and Geology Forest-wide Standards and Guidelines.

Background: A wide range of mineral resources and deposit types occur within the boundaries of the Tongass National Forest. Examples of some include gold, silver, molybdenum, and uranium. The Forest also has nationally designated "strategic" and "critical" minerals such as lead, zinc, copper, tungsten, and platinum group metals. The Forest Service recognizes that minerals are fundamental to the nation's well being and, as policy, encourages the orderly exploration and development of mineral resources on National Forest System lands. The Secretary of Agriculture has provided regulations (36 CFR 228) to ensure surface resource protection during the exploration and development of the mineral resources.

Minerals and Geology Question: Are the effects of mining activities on surface resources consistent with Forest Plan expectations, as allowed in approved Plans of Operations?

During FY 1999, approximately 90 percent of the active mining operations on the Tongass National Forest were inspected as required for project monitoring and compliance in Minerals Program Directives. The Forest processed and inspected 85 non-bonded non-energy operations, or 100 percent, for compliance with agency regulations. The Forest also processed 43 bonded non-energy operations, of which only 34, or 80 percent were inspected and administered to Mineral Program Directive standards. Non-bonded non-energy operations include mineral exploration activities and free-use material sales that do not cause significant disturbance of the surface resources. Bonded non-energy operations include mining plans of operations that will likely cause significant disturbance of surface resources and common variety mineral sales in excess of 100 cubic yards. The Mineral program standard is to inspect each operation/site at least once per year.

Site visits include inspections for compliance with agency regulations, the approved plan of operations, resource protection measures addressed in the plan, compliance with State or other Federal permits, and completion of monitoring provisions in plans. Activities inspected include exploration work sites, reclamation work, road construction and maintenance, timber removal, public safety and fire prevention, solid waste disposal and project monitoring. Operators were notified of problems, and follow-up action was documented.

Monitoring Results

The following sites were visited during this year's Forest Plan monitoring efforts to verify project monitoring effectiveness:

- Salt Chuck mining claim on Thorne Bay Ranger District (Photo No. 1)
- Puyallup claims on the Craig Ranger District (Photo No. 2)
- Ken Eichner mining operations on Kosciusko Island (northwest side of Prince of Wales Island) (Photos No. 3 and No. 4)
- Craig Ranger District material sale site (rock pit) located just north of Hydaburg on Prince of Wales Island (Photo No. 5)
- Ken Eichner mining claims near Nelson Glacier on the Wrangell Ranger District (Photo No. 6)
- Reclaimed Nemo material site south of Wrangell, Alaska (Photo No. 7)
- Olympic Resources Group active mineral exploration on Woewodski Island south of Petersburg, Alaska on the Petersburg Ranger District (Photo No. 8)

Photo 1. Salt Chuck mining claim on Thorne Bay Ranger District



Reclamation of an access road and exploration trenching on the Salt Chuck mining claims, Thorne Bay RD. Orbex Industries had the claims, but abandoned them in the 1980's. The Thorne Bay Ranger District used the operator's \$2,000 reclamation bond to do the reclamation work in 1997. The site was inspected this year to ensure sustained vegetation establishment, and released from further reclamation needs.

Photo 2. Puyallup claims on the Craig Ranger District



Current Mineral activity on the Puyallup mining claims approved in FY-99 under a mining plan of operation on the Craig Ranger District. Reclamation Bond required in the amount of \$7,500.

Photo 3. Mining operation of Ken Eichner on Kosciusko Island (northwest side of Prince of Wales Island)



Reclamation of an access road for mineral exploration on the eastern side of Kosciusko Island in the vicinity of Tokhini Creek (northwest side of Prince of Wales Island) in the southeast quarter of Section 23, Township 66 South, Range 77 East. The operator is Ken Eichner. No reclamation bond was held for this site/work. This site was reclaimed by the operator at the request of the District Ranger during the past couple of years. Reclamation of the site is considered successful at this time.

Photo 4. Mining operation of Ken Eichner on Kosciusko Island (northwest side of Prince of Wales Island)



This is an extension of the mineral exploration road shown in Photo 3 above. Mining claimant Ken Eichner began reclamation work in 1993. Mining operation is on northeast side of Kosciusko Island.

Photo 5. Craig Ranger District material sale site (rock pit) located just north of Hydaburg on Prince of Wales Island



Forest Service rock pit on Prince of Wales Island located north of Hydaburg. Operations are kept to the pit area as prescribed by the pit plan under the material sale contract. Reclamation of the pit will begin in late September under provisions of the material sale contract. The material contract was closed and final inspection completed during the last week in October 1999.

Photo 6. Ken Eichner mining claims near Nelson Glacier on the Wrangell Ranger District



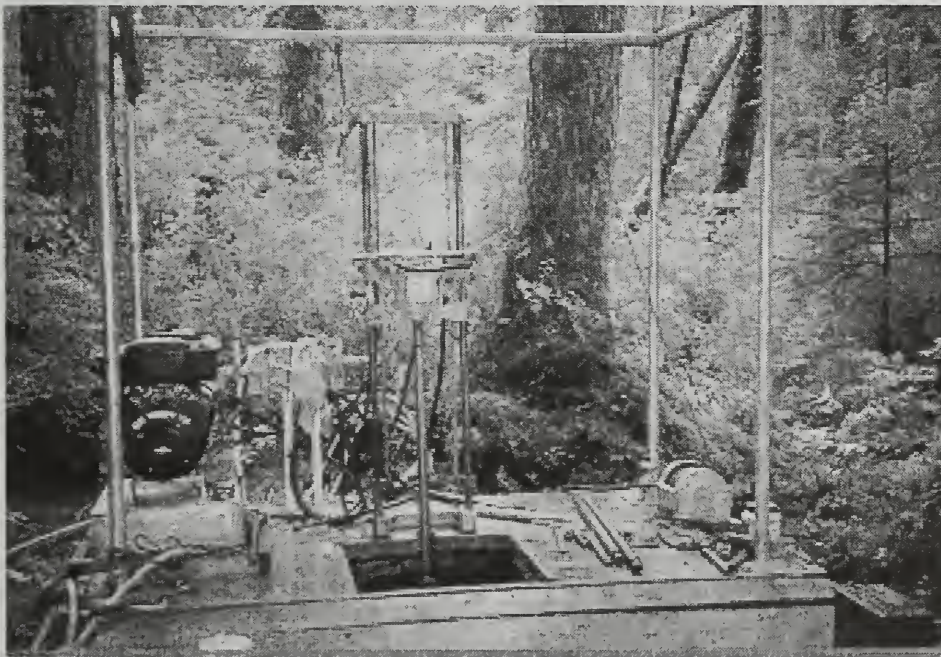
Reclamation work by Ken Eichner on his mining claims in Section 18, Township 62 South, Range 86 East, in the vicinity of Nelson Glacier and Marsha Peak. The mining claims were not inspected between 1993 and 1998. Since 1998, claimant has removed three structures and numerous sling loads of debris from the site. Wrangell District personnel are continuing to work with the claimant through the mineral regulation to complete the site cleanup and restore the lands to as near a natural state as possible.

Photo 7. Reclaimed Nemo Material Site South of Wrangell Alaska



An old Nemo material site (rock pit) used for the construction and development of a campground south of Wrangell, Alaska. Located in Section 20 of Township 64 South, Range 84 East, on the Wrangell Ranger District, the site was reclaimed during the 1994 and 1995 seasons following its use. Today the site is used as a visitor attraction, providing information to users of the campground and surrounding area. The site is also home to the campground host during the summer months.

Photo 8. Olympic Resource Group Active Mineral Exploration on Woewodski Island South of Petersburg Alaska



Mineral exploration site of the Olympic Resources Group on mining claims located in Sections 22 through 26 of Township 61 South, Range 79 East in the center of Woewodski Island. The Petersburg District Ranger approved the claimant's Plan of Operations on March 3, 1999. Under the approved Plan, the claimant will access the site by foot and helicopter, remove all equipment at the end of each field season, cap all drill holes when operations cease or are no longer needed, and seed disturbed areas.

Evaluation of Results

Inspections of mineral activities indicate that the effects of mining activities on the surface resources are consistent with Forest Plan expectations for mineral operations, and what was envisioned or expected in the environmental analysis and approval of each Plan of Operations.

The Juneau Ranger District and Admiralty National Monument continue to implement best management practices (BMPs) at the Kensington and Greens Creek mines, and determine the effectiveness of those BMPs in protecting the water resources.

While the active locatable minerals workload on the Craig, Ketchikan, Petersburg, Thorne Bay and Wrangell ranger districts has remained constant during the past year, the districts have experienced an increase in the requests/demand for mineral materials (sand and gravel/shot rock). Material contracts and permits for mineral materials contain mitigation requirements and BMPs for reducing impacts to the water resources, as identified in the environmental analysis for each permit. The material sites are inspected annually for compliance, and reclaimed when contracts expire or the material is exhausted.

Fiscal year 1999 inspections of mineral sites indicate that the effects of mining activities on surface resources are consistent with Forest Plan expectations. The requirement that the operators obtain approval for their Plans of Operation provides the Forest Service the opportunity and authority to control the effects of the development on the Forest surface resources.

Recreation and Tourism

Goal: Provide a range of recreational opportunities consistent with public demand, emphasizing locally popular recreation places and those important to the tourism industry.

Objectives: Manage the Forest's recreation settings in accordance with the Recreation Opportunity Spectrum (ROS) standards and guidelines for each Land Use Designation (LUD).

Background: The Tongass National Forest possesses a remarkable and unique combination of features. These include inland waterways with over 11,000 miles of shoreline, mountains, fiords, glaciers, and large or unusual populations of fish and wildlife that provide a wide range of excellent outdoor recreation experiences. Many of these opportunities cannot be duplicated elsewhere in North America, or most other places around the world. Southeast Alaska imparts a feeling of vastness, wilderness, and solitude. A small residential population and relative absence of development enhances these feelings.

Recreation and Tourism Question 1: Are areas of the Forest being managed in accordance with the prescribed Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards and Guidelines?

The specific monitoring activities included: analyzing proposed and completed project areas to determine whether ROS standards and guidelines were being implemented; condition surveys of recreation cabins, trails, and special-use cabins to monitor impacts; recording cabin reservations; conducting visual surveys of dispersed recreation sites and known destination areas for indications of ROS class standards.

The monitoring process described as follows was implemented on the Ketchikan/Misty Ranger District but is generally representative of the monitoring process. The monitoring crew reconnoitered the areas systematically, prioritizing the terrain covered within each area according to current use or potential use. Shoreline along saltwater received first priority, followed by lakes large enough to support float plane landings, sub-alpine ridge systems utilized by hunters, and finally any drainages that had the potential for recreation use from hunting/fishing to jet boating/kayaking/rafting.

Surveys looked for existing and potential sites and route possibilities, as well as documented and quantified encounters during the course of the day. When existing sites were located, they were mapped and photographed. Plots were surveyed within both potential and existing sites to determine levels of disturbance and establish a basis for further monitoring. Visual surveys were conducted on an as-encountered basis for both existing structures and cruise ships seen within the view shed. All data collected was entered into a database and included in the specialist reports. Recommendations for completion of monitoring and rotations for future monitoring are given based on what was found on the ground. Forest Service personnel were notified of any items that require special attention or fall outside the scope of the Standards and Guidelines and the ROS classifications.

Monitoring Results and Evaluation

Overall, the Tongass National Forest is being managed in accordance to the prescribed ROS class in the Forest-wide standards and guidelines. The management of the different ROS classes includes: identifying areas where use remains consistent with the management goals; recognizing and changing the ROS class where necessary to manage for changing conditions; and identifying areas where the use may be inappropriate to the setting or management objectives.

Table 16 displays specific areas found to be consistent with the current ROS class. Besides these areas, district personnel documented other activities along the shoreline, at recreation cabins, on trails, through outfitter and guide permit administration, and from correspondence and comments from the public. Detailed information describing the monitoring results at each location is available upon request.

Table 16. Specific Areas Found to be Consistent with the Current ROS Class

| Ranger District | Geographic Area |
|---------------------------------|--|
| Admiralty National Monument | Windfall Harbor Brothers Island Hood Bay, Whitewater Bay, Freshwater Lake Kanalku, Mitchell Bay, Wilson Cove Hasselborg Lake Admiralty Lakes Seymour Canal, East Glass Peninsula North-Central Seymour Canal Admiralty Cove Young Lake Pybus Bay Cross Admiralty Canoe Route Lake Alexander Distin Lake Tyee |
| Hoonah Ranger District | Trail River Point Adolphus/ Pinta Cove |
| Petersburg Ranger District | Woodpecker Cove Twin Creek Mitcof Trail Ohmer Creek Campground |
| Sitka Ranger District | Lake Eva Trail Kelp Bay |
| Thorne Bay Ranger District | Horseshoe Hole Campground |
| Wrangell Ranger District | Wrangell Island Anan Wildlife Viewing Area Stikine River LeConte Bay |
| Ketchikan/Misty Ranger District | Grace Lake Snip Island Portage Cove Lake 199' Lower Chickamin River Upper Chickamin River Walker Lake Lecuc River Walker Cove South Walker Behm Canal |
| Juneau Ranger District | Juneau Road System Trails |

Monitoring results show that there are some areas where activities compromise the desired setting (see Table 17). Conflicts occur by the use of motorboats or airplanes adjacent to the National Forest and associated commercial use of the Forest for recreation. Particularly these conflicts occur where activities exceed desired objectives for party sizes or number of encounters. Since the State manages the waterways and the Federal Aviation Administration manages the air space, the focus of the Forest Service, in these cases, is with the maintenance of the setting or the administration of the setting. Management action has been taken to maintain the ROS classes. One example of this action was Windfield Harbor, where a freeze on additional outfitter guide use was implemented so the area remained within the ROS guidelines. Additional coordination between agencies with adjacent resource

management responsibilities would be beneficial in aiding the Forest Service efforts in managing areas where non-conforming conditions exist.

Table 17. Areas Where Use was Occasionally Reported not to be Consistent with the Current ROS Class

| Ranger District | Geographic Area |
|---------------------------------|--|
| Admiralty National Monument | Pack Creek |
| Petersburg Ranger District | Petersburg Creek |
| Sitka Ranger District | Emmons and Moser Islands North Hoonah Sound, Patterson Bay Goose Flats, Tenakee Inlet |
| Thorne Bay Ranger District | Sandy Beach Day Use Area |
| Ketchikan/Misty Ranger District | Lower Rudyerd River Rudyerd Bay Head Ella Lake Ella Bay Manzanita Lake Manzanita Bay Punch Bowl Lake Punch Bowl Cove Eddystone Rock Behm Canal Big Goat Lake Nooya Lake Sargent Bay |

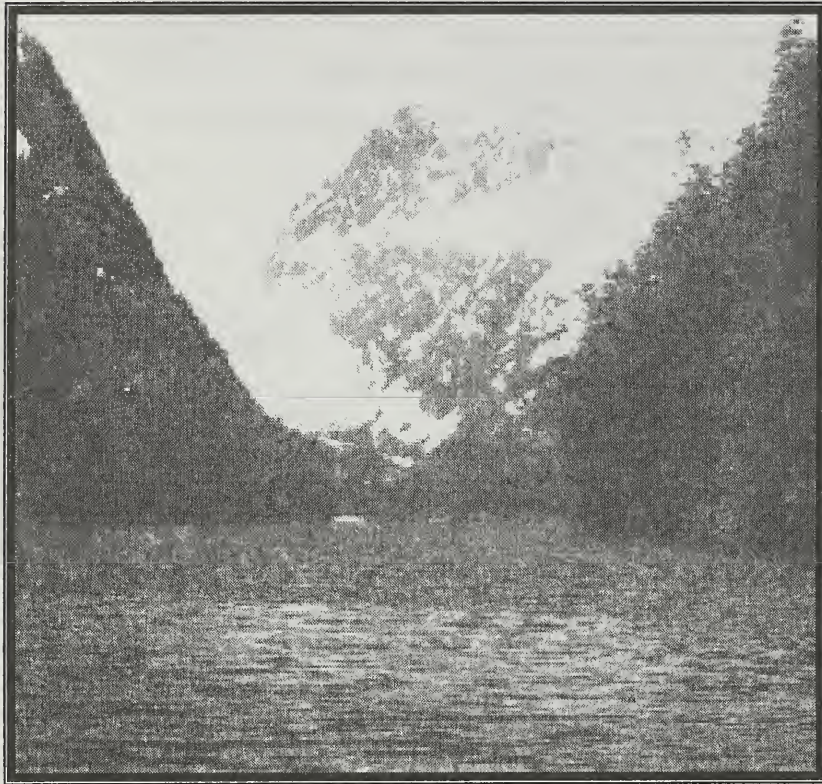
The locations listed in Misty Fiords National Monument Wilderness are all in the flight path for the commercial sightseeing industry in route from Ketchikan to Rudyerd Bay and Punch Bowl Cove. The social encounters in these areas are considered inconsistent with existing standards and guidelines. On certain days, low-flying and occasional landing flightseeing counts total over 100 flights a day, depending on weather conditions and tour ships at port in Ketchikan. Tour ship traffic is also increasing in Ketchikan and in Misty Fiords. These activities disturb and occasionally harm wildlife and view sheds, and affect the experience of the user. The Semi-Primitive to Primitive ROS classes for these areas need to be evaluated against the increasing use.

At Pack Creek and Petersburg Creek, there were times when either the party size or the number of groups exceeded the standards and guidelines. At Emmons Island, Moser Island, and Goose Flats, storage of fishing gear distracts from the setting. The Sandy Beach Day Use Area setting does not meet the standards and guidelines; the setting is too close to a heavily traveled road. The Hoonah Sound area has an increasing amount of boat traffic occurring, which has changed the ROS classification to a Semi-Primitive Motorized experience from the current Primitive classification.

Some ranger districts identified settings where the current ROS class was no longer appropriate for either the setting or the activities taking place. These changes have either been adopted or are being considered. One change in the ROS class is on Kuperanof Island, where timber sales have resulted in changing formerly Semi-Primitive Non-Motorized settings to Roaded Modified. There are six settings on the Sitka Ranger District recommended for management as Semi-Primitive Motorized instead of Primitive, because of changes in either the frequency or type of use. The changes to the ROS setting either completed by the ranger districts or recommended are consistent with the Forest Plan standards and guidelines.

Continued efforts are constantly improving the monitoring process. Standardization of the monitoring protocols is underway. The Ketchikan/Misty Wilderness monitoring program has been standardized and organized under a single precedent utilizing an ecosystem approach to their condition monitoring

assessments. This program won the "Aldo Leopold National Wilderness Award" for most outstanding wilderness program in the country and is considered a leader nationally by other units with wilderness management responsibilities. Progress on a monitoring pilot was made for the Point Adolphus area. In the Point Adolphus area, a collaborative stewardship project was established to develop a protocol for recording activities. Plans are also made to develop some templates for data collection and reporting monitoring activities.



South Baranof Wilderness Area. Mt. Ada as seen from Patterson Bay, May 1999.

Recreation Question 2: Is Off Road Vehicle (ORV) use causing, or will it cause, considerable adverse effects on soil, water, vegetation, fish and wildlife, visitors or cultural and historic resources of the Forest?

ORV use occurs across the Tongass National Forest, and the effects vary depending upon location, type of use, and the intensity of the use. ORV use includes all-terrain vehicles, snowmobiles, jet skis, and four-wheel drive vehicles for access to remote or desired locations.

Monitoring Results

Most ORV use occurs on Forest Service system roads. The highest use of all-terrain vehicles and four-wheel-drive vehicles is during hunting seasons. On occasion, use occurs off the road system by these types of vehicles, and some impacts to the local vegetation, soils and streams have been documented.

ORV use has been reported in areas with road access from communities as well as on isolated road systems. On the several isolated road systems accessible only by floatplane or boat, it is a common activity for enthusiasts to haul four-wheelers by landing craft to traverse these road systems for hunting and recreation.

The use of snowmobiles appears to be growing on the Forest. Snowmobiles are an authorized form of transportation for access, as allowed by the Alaska National Interest lands Conservation Act of 1980. Use occurs near many communities and in some wilderness. Snowmobiles may only be operated when snow cover is adequate, so impacts to soils and water resources is normally minimal. Use during periods of inadequate snow cover has been documented. The expansion of snowmobile use and the effects on other resources, such as wildlife, are assessed locally. Some ranger districts are working to develop transportation management plans for ORV use.

The tables that follow list several areas that have ORV use and the relative effect or potential effect of ORV use. Detailed information describing the monitoring results and specific evaluation of these areas is available upon request. Additional monitoring needs to be completed in the areas where there potentially may be problems associated with ORV use, or use has been reported but not monitored.

Table 18. ORV use not causing nor potentially causing problems

| Ranger District | Geographic Area |
|----------------------------|---|
| Hoonah Ranger District | Mud Bay Seal Creek 8 Fathom Salt Lake Bay |
| Petersburg Ranger District | Twin Creek Blind Slough |
| Sitka Ranger District | Starrigaven ATV Trail |
| Yakatat Ranger District | Situk River Trail |
| Wrangell Ranger District | North of 6259 Rd on State of Alaska lands Off end of FDR 5002, Hermit TS FDR 6267, Near Junction of Trun Rd. FDR 6271, Long Lake FDR 6588, Alpine Rd. FDR 52022 FDR 52021, Fritter Rd. FDR 6590, Meter Bight |

Table 19. ORV use causing or potentially causing problems

| Ranger District | Geographic Area |
|---------------------------------|--|
| Juneau Ranger District | Dan Moller/ Treadwell Ditch Trails Lake Creek Trail/ Spaulding Meadows Mendenhall Lake |
| Ketchikan/Misty Ranger District | Brown Mountain Harriet Hunt Road 410 Hyder Area |
| Petersburg Ranger District | Upper Falls Creek |
| Sitka Ranger District | Iris Meadows |
| Yakutat Ranger District | Yakutat area |

Table 20. ORV monitoring needs to be initiated

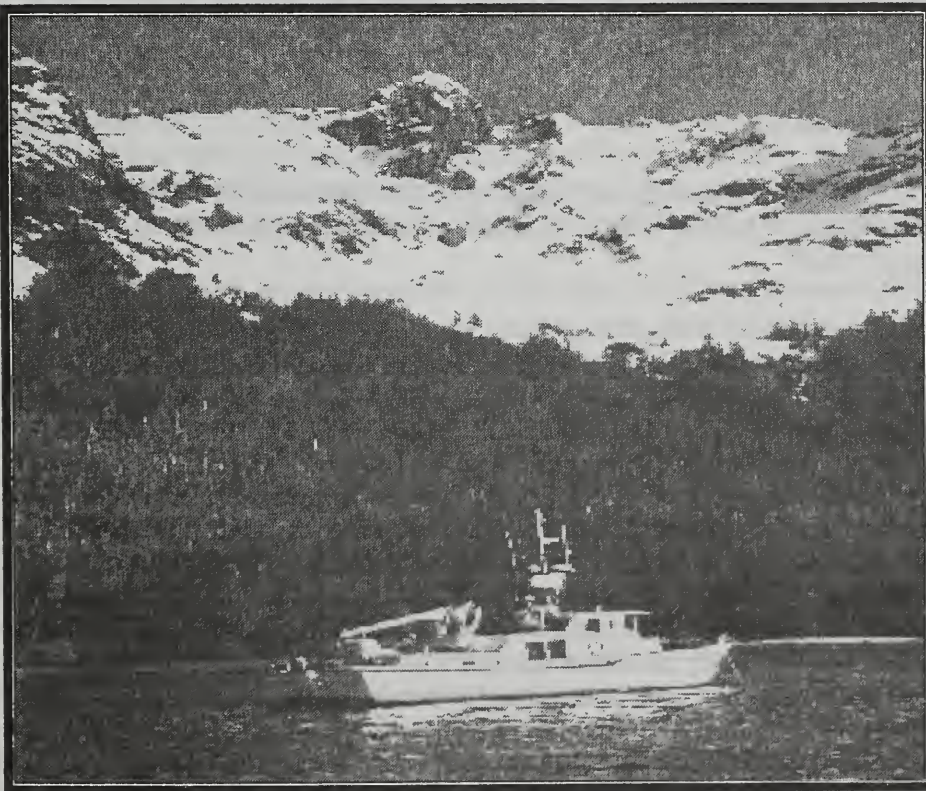
| Ranger District | Geographic Area |
|---------------------------------|--|
| Ketchikan/Misty Ranger District | Harriet Hunt Road 410 Hyder Area |

Evaluation of Results

Overall, most use of ORVs on the Tongass does not create resource damage. A particular example of ORV use where little impact is apparent to the other resources is on the Wrangell Ranger District. Resource impacts have been reported by the Juneau, Petersburg, Sitka, Yakutat, and Ketchikan/Misty ranger districts. Significant impacts have occurred on the Yakutat Ranger District. Efforts to resolve the problems associated with ORV use have been initiated and will continue through next fiscal year. Travel management plans in some areas, such as the plan recommended on the Ketchikan/Misty Ranger District, will serve to resolve some of these issues.

District personnel in Yakutat worked with the local community to raise awareness of the impacts of a popular ORV travel corridor. The corridor was rerouted to minimize stream crossings, while also providing access to desired destinations. Forest service personnel used a helicopter-borne GPS unit (Trimble DGPS GPS) to map ORV trails on the Yakutat forelands. In the mapping effort, 71 miles of trails were located and mapped. This represents 80 percent of the "pioneer" trails that now exist on the Yakutat Ranger District. Much of this trail network is located in open wetlands. Many trail segments show numerous parallel ruts and includes multiple crossings of salmon streams. The re-routing of the travel corridor and proposed management strategy for ORV use will contribute to resolve some of these problems.

The Yakutat Ranger District, in partnership with the Yakutat Tlingit Tribe, is working toward developing a strategy for managing ORV use on the National Forest. In 1999, the District and the Tribe hosted public meetings in Yakutat to discuss ORV use. The consensus from these meetings is that people want ORV access to the National Forest for hunting. The Yakutat Ranger District initiated a trail relocation project in the Situk River watershed this year. A 1.19-mile trail was constructed to bypass a pioneer trail that ran through wetlands and fish habitat.



Research

Goal: Continue to seek out and promote research opportunities that are consistent with identified information needs.

Objective: Cooperate with PNW in pursuing the high priority information needs identified in Appendix B [of the Forest Plan] through the intra-agency agreement entitled "Joint Studies for Improved Future Tongass National Forest Planning" and other means.

Background: Appendix B of the Forest Plan identifies priority research important for further Forest Plan amendment or revision and lists additional data and information needs that will help to implement the Forest Plan. While not essential to the completion of the Forest Plan, results of the priority research items, prior to the completion of the next revision of the Forest Plan, will substantially strengthen the scientific information base needed to support alternative development. An important element of the priority research items and additional information needs is an "adaptive management" feedback loop to evaluate current plan direction, design monitoring programs to measure effects, and adjust future management activities to better address economic, social, and environmental concerns on the Tongass. As a part of this process, statistically sound sampling design and analysis techniques need to be developed to assure reliability of monitored data and interpretations. This additional research component will be important for maintaining the scientific creditability of the Forest Plan.

Research Question: Have identified high-priority information needs been fulfilled?

Monitoring Results

The following is a summary of the progress and significant results from research studies addressing high priority information needs and other information needs. Listed for each applicable priority need is the research need stated in TLMP, Appendix B followed by a statement that briefly describes the focus of the research.

Project 1: Alternatives to Clearcutting (ATC)

Objectives: Evaluate a wide range of silvicultural options for managing old-growth forests in Southeast Alaska in order to determine their biological, physical, and socioeconomic effects; and to clarify the operational issues related to ATC treatments.

Accomplishments: A retrospective study indicates that partial cutting rarely leads to western hemlock dominance at the expense of Sitka spruce; partial cutting can sustain abundant and diverse understory plant communities, and fosters vigorous and productive stands. These results were presented at national, regional, and local meetings, and in a Ph.D. dissertation and master's thesis. Post-treatment evaluations of the first experimental block (Hanus Bay) continued, examining effects on stand dynamics, plant diversity and abundance, damage agents, aquatic and avian ecology, hydrology, and social acceptability. Harvesting began on the second block (Portage Bay), and the timber sale for the third block (Lancaster Cove) was purchased, clearing the way for harvest in year 2000 or 2001. Although post-treatment responses are still developing, this work has provided evidence for the technical feasibility of ATC treatments and has quantified the levels of harvest-related damage to be expected. Analyses of pre-treatment measurements have yielded important new findings about small-scale disturbance agents, regional variation in bird community structure, avian nest predation, terrestrial linkages to headwater streams, and the hydrology of steep, shallow soils.

Benefits to NFS: This study provides a greater number of scientifically tested options for joint production of wood and other forest values. Information on the costs and benefits of adopting alternative silvicultural systems, allowing better informed choices among management alternatives is supplied through the study findings. Alternative systems may lead to reduced conflict and greater social acceptance of commodity production, by yielding sustainable timber harvests, protecting fish and wildlife habitat, maintaining biological diversity, maintaining slope stability, and reducing visual impacts. This study provides guidance for implementing Forest Plan direction to increase the use of alternatives to clearcutting.

Project 1a: Alternatives to Clearcutting (ATC) --Social Acceptability of Alternative Forest Management Practices

The larger interdisciplinary study aims to evaluate the ecological, economic, operational, and social aspects of an array of timber harvesting techniques as alternatives to clearcutting old-growth forest stands in Southeast Alaska. This long-term project comprises the social acceptability component of the larger study.

Objectives: FY1999 objectives included completing exploratory field interviews concerning the social acceptability of alternatives to clearcutting, undertaking a literature review on this topic, and developing a survey approach to measure public attitudes, values, and experience related to a range of forest management practices.

Accomplishments: Field interviews with 27 key respondents were completed in summer, 1999. After preliminary findings from the larger ATC study were presented, interviewers asked respondents to rate different harvesting treatments. Respondents were asked to explain the rationale underlying their preferences. Interviews have been transcribed and analysis is proceeding. A review of social acceptability was completed during FY 1999. The review identified key components of social acceptability and public response to forest management practices. Finally, these two study components provided a basis for developing a survey interview approach in which public attitudes and values related to various forest management practices will be measured. Survey interview questions were developed for inclusion in a planned Regional survey.

Benefits to NFS: Much information concerning public attitudes and values related to timber management practices was gathered during the revision of the Forest Plan. This project will further our understanding of public preferences for and responses to future forest management practices. Findings from this project will assist in developing management plans that may achieve higher public acceptance.

Project 2: Effects of Silvicultural Treatments on Young-Growth Wood Quality

Objectives: The objective of this research is to quantify the relationships among silvicultural treatments (thinning and pruning), site conditions, and several measures of wood quality for young hemlock-spruce stands in Southeast Alaska.

Accomplishments: We collected Sitka spruce and western hemlock wood samples from stands thinned 22 to 24 years ago. The sample includes highly and moderately productive sites, stand ages of 15 to 45 years at time of thinning, and four levels of thinning intensity, from none to heavy. Laboratory testing of butt-log samples showed that wood mechanical properties (strength and stiffness) declined with heavy thinning. We began X-ray densitometry studies on 1,215 disks to determine basic wood properties—density, growth ring uniformity, and the distribution of heartwood, juvenile wood, and reaction wood—and the variation within trees and among treatments. We are developing a branch model for Sitka spruce and western hemlock that will use species, thinning intensity, thinning timing, and site quality to predict the distribution and abundance of branches and grade-reducing knots in wood produced in young-growth stands. Pruning studies established between 1990 and 1993 were re-examined to determine epicormic branch development, understory plant response, and conifer regeneration.

Benefits to NFS: Understanding the link between silvicultural practices and young-growth wood quality will aid silviculturists and planners in modeling and prescribing intermediate treatments to maximize benefits from developing young stands.

Project 3: Evaluation and Development of Growth-and-Yield Models for the Adaptive Management of Young-Growth Stands in Southeast Alaska

Objectives: Facilitate use of FVS-SEAPROG by improving the quality of the antecedent stand exam analysis program and its linkage to SEAPROG; assist the extension of SEAPROG with mistletoe and decay subroutines; produce a documented analysis of FVS-SEAPROG performance, its applicability to adaptive management decision-making, and recommendations for enhancements; and migrate growth data from studies of partial cutting into the model.

Accomplishments: We completed our joint effort with the Region and Atterbury Consultants to eliminate known problems with Superstand, the stand-exam program that provides the base data for FVS model runs. Improvements included correcting the procedure for deducting defect volumes, revising volume calculation routines to ensure application of appropriate volume equations, revising procedures for applying height-diameter relations, and revising output to be compatible with SEAPROG input requirements. Meetings were held with the WO Timber Management Unit at Fort Collins, CO, to plan two extensions of FVS-SEAPROG: incorporate Trummer's model of mistletoe spread from residual trees to regenerating stands and add the Hennon-DeMars model of decay development following bole wounding of Sitka spruce and western hemlock. Because of other team commitments, we were unable to achieve the remaining objectives, and reprogrammed \$25,000 of the original NFS funds into the ATC study.

Benefits to NFS: Enhanced ability to predict the development of forest vegetation structure following natural disturbances, or after management activities for timber, habitat, restoration, or visual objectives. Improvement of young-growth timber productivity modeling was identified as a high-priority information need during the recent Forest Plan revision.

Project 4: Goshawk Nest Tracking and Prey Abundance

Objectives: To locate and monitor bird use of known and new goshawk nest sites and to determine and estimate the abundance of potential bird and mammal prey for northern goshawks among habitats represented in commercial timberlands.

Accomplishments: The study is providing more detailed information on goshawk movement patterns, home range size, habitat use, and survival. Several surveillance cameras have recorded thousands of hours of video footage, helping to identify use patterns and prey brought to nests by adults to feed to young. During the field season, goshawks were banded on various nest sites and many radio-collared goshawks were monitored during the year. Results from the monitoring continue to indicate that the birds predominately use mature and old-growth forests for nesting and foraging.

Benefits to NFS: Identifying habitats that support prey species will help with understanding the need, if any, for mitigation procedures to support goshawks when developing and evaluating potential timber sales. The information will be developed into a wildlife relationship model to help managers evaluate value of different habitats to goshawks.

Project 5: Density and Demography of Endemic Small Mammals

Objectives: The purpose of the effort is to determine habitat relationships and estimate density of two endemic small mammals (Prince of Wales flying squirrel and Wrangell Island red-backed vole) among forest habitats of the Tongass National Forest. Specific objectives include documenting the following among commercial forest land habitats: 1) density of POW flying squirrels in productive old-growth and mixed-conifer habitats; 2) age and sex composition of study grid samples; 3) number of reproductive females; and 4) microhabitat features associated with capture of individuals' age and sex groups.

Accomplishments: Completed second field season on six study sites representing two prominent cover types on Prince of Wales Island, and eight study sites representing four important cover types on Wrangell Island.

Benefits to NFS: This project meets strong commitments in the TLMP Record of Decision (April 1999) and Forest Plan to generally increase study efforts on endemic small mammals. It also provides baseline ecological information regarding habitat distribution and abundance among four important forest habitats for two reputed old-growth habitat species that are endemic to Southeast Alaska and consequently have limited geographic ranges. This information will contribute toward a habitat model that should aid in determining habitat needs and the potential effects of timber harvesting in preferred habitat.

Project 5a: Endemism and Distribution of Terrestrial Mammals on the Tongass National Forest

Objectives: Document endemism and distributions of the terrestrial mammal fauna of Southeast Alaska.

Accomplishments: This effort is still discovering new species records for major islands; for example, water shrews on Wrangell Island, flying squirrels on Dall Island, and ermine on Heceta Island. This study continues into FY 2000.

Benefits to NFS: Effort satisfies strong commitments in the TLMP Record of Decision (April 1999) and Forest Plan to evaluate the distribution and degree of endemism in small mammals in Southeast Alaska. When completed, the work should allow the Forest Service to model the likely impacts of timber harvesting on endemic small mammals in various locations.

Project 6: Salmon Habitat Monitoring

Objectives: To develop effectiveness monitoring protocols for aquatic habitat conditions.

Accomplishments: Major initial tasks have been completed, including development and refinement of data collection and analysis procedures, which have been detailed in draft reports. Surveys of physical variables have been completed one or more times on a total of over 50 stream reaches. Measurements of salmonid abundance, species composition, and distribution have been done on more than 30 reaches. Data analysis is in progress to determine salmonid response and variation to habitat measurements at multiple scales (reach, stream, and watershed). Experience and preliminary analyses indicate that in order to collect objective, consistent, and repeatable data, the number of field crews should be minimized. For the physical measurements, two well-trained crews serving the north and south Tongass National Forest respectively appear to provide reasonable efficiency and adequate control of data collection errors. Initial results indicate measurable differences among stream channels with different land use histories. This preliminary finding, if verified through the remainder of the study, will be very helpful in evaluating channel responses to management actions.

Benefits to NFS: The identification and measurement of interactions between aquatic/riparian habitat and disturbances in upland areas, and the response of anadromous and resident salmonids, will provide information necessary to properly design major ground-disturbing activities in upland areas to minimize impacts on salmonid habitats.

Project 7: Community Level Economic Impacts and Dynamics

By providing empirical estimates of impact processes and a more detailed understanding of the determinants of local economic structure, this study area seeks to identify the dynamics of growth and impact in the region and its communities. This information, in turn, may be used to improve impact assessment and management decisions.

Objectives: A major objective is to provide quantified, empirically based estimates of the impacts of changing timber employment on other types of local employment. An additional objective is to identify major determinants of growth and change in local economies.

Accomplishments: Robertson completed a Ph.D. thesis that provides an empirical estimation of the community level impacts of changing timber employment in Southeast Alaska. Robertson also completed a draft (currently in review) study quantifying the major determinants of economic growth and structural change in Southeast Alaska. This latter study concentrated on the increasing role of non-manufacturing and non-wage income in the regional economy.

Benefits to NFS: The benefits to the Forest Service in Region 10 include better estimation procedures and parameters of the expected impacts of future planning decisions. These can be used in impact assessments in future planning efforts and to generally assess the impact of policy on communities and their residents. More generally, both of the studies listed above help managers to understand the implications and limitations of their decisions on the welfare of residents and forest users.

Project 8: Recreation and Tourism

Recreation and tourism present a number of challenges to management of the Tongass National Forest. In contrast to timber, recreation/tourism outputs are difficult to measure, they usually have no explicit dollar value, and their "production functions" are not easily defined. Similarly, the influence of management decisions on the quantity and quality of outputs, as well as the impacts of recreation/tourism development in general on local welfare are still not well understood. With the increasing importance of recreation/tourism in Southeast Alaska, the need to better understand this resource and its relation to management has become increasingly obvious. This study program is designed to meet this need.

Objectives: The central objective of this study program is to define and explore central questions and topic areas for future research. Initial research directions include: (1) demand for forest-based recreation/tourism; (2) role of recreation/tourism in local economic development; and (3) allocation and pricing of recreation/tourism opportunities. This problem definition should be seen as an ongoing process in which research products and "answers" will be used to identify future research questions and directions.

Accomplishments: FY 1999 accomplishments in this area include the production of a draft study identifying the central issues and primary literature related to the economics of nature-based recreation/tourism (Klein). Also, a study of economic growth and change (Robertson, see Community Dynamics project) partially identifies the role of recreation/tourism in local income growth. Additional contributions entail work by Robertson and Cervery in the preparation of a draft information needs section in the Region 10 publication, "Alaska Region Recreation, Tourism, Wilderness, & Heritage Strategy."

Benefits to NFS: The benefits to the Forest Service in Region 10 include a better understanding of the central issues involved in recreation/tourism management of the Tongass National Forest. Work in this area also will serve to summarize for managers the experience of professionals working in recreation/tourism in other regions and countries. Hopefully, it will identify specific policy improvements enhancing public benefits or Forest Service revenues.

Project 9: Timber Supply and Markets

This project focuses upon the economics of timber production and wood products processing in Southeast Alaska. Main topics include: (1) production costs and the Region's relative advantage in different types of wood products production; (2) the relative position of Southeast Alaskan species and log grades in foreign markets; and (3) demand projections for the Region's wood products.

Objectives: The project's objective is to develop economic and market information to better inform Forest Service policy makers. Specific examples include demand projections in relation to the TTRA and TLMP, identification of fiscal impacts of policies such as the cedar log export ban, assessment of the viability of different types of timber processing activities, and identification of the relative efficiencies of different policies to promote value-added manufacturing in the Region.

Accomplishments: FY 1999 accomplishments include the completion of a review draft assessing the competitive and comparative advantage of Southeast Alaska's wood products sector (Robertson and Brooks), and the completion of a draft market arbitrage study assessing the linkage between Southeast Alaskan timber prices and those of Washington and Oregon (Stevens). Additional work entails contributions by Brooks and Robertson to Timber Future and Wood Products workshops in Juneau (8/99) and Sitka (9/99).

Benefits to NFS: The benefits to the Forest Service in Region 10 from this competitive advantage study include a detailed analysis of production costs in the Region and the assessment of the profitability of different products, species and log grades. This information, in turn, will be an essential element in identifying efficient and inefficient policies designed to achieve Forest Service policy goals in the area of timber management, particularly efforts to promote value-added processing in the Region. The market arbitrage study quantified the linkages between prices in Southeast Alaska and those of the PNW. This information, in turn, can be used to link R10 market and planning projections with broader national projections such as those found in the RPA.

Project 10: Tourism/ Recreation Studies

This long-term project initiates study of tourism and recreation topics in the Tongass National Forest. Research is planned to examine aspects of the increasing tourism and recreational use of the forest, residents attitudes and values concerning tourism development, tourism and recreation demands on forest resources, tourism and recreation growth vectors, and the interaction of tourism and recreation with other forest uses. Initial research will focus on Southeast Alaska residents and communities. Subsequent years' research will examine visitors' experience with the Tongass National Forest and the national perspective on the use of this forest for recreation and tourism.

Objectives: Objectives for the 1999 work were to review relevant literature related to tourism and recreation, examine tourism and recreation data for the Tongass National Forest, develop a long-term research design for this study area, and to begin to flesh out qualitative and quantitative research approaches to guide this effort.

Accomplishments: A review document, "Tongass Tourism Themes: Socioeconomic Research Needs and Opportunities in Southeast Alaska," was completed by a cooperator. This document provides useful information on tourism development in the region and outlines some possible research directions for further studies. Staff reviewed available literature and data for the Tongass National Forest, and completed a series of structured interviews with Southeast Alaska residents actively working with tourism and recreation issues. The review and interviews formed a basis for developing a research strategy. Work with another cooperator, University of Alaska, Institute for Social and Economic Studies, developed a sampling strategy and a draft survey instrument for a large-scale survey of Southeast Alaska residents. The resident survey will include large sections on tourism and recreation topics. Finally, work began on a community-based tourism research component that will complement the large-scale survey studies. This study component will use a case study method to examine community interactions with tourism and recreation.

Benefits to NFS: Tourism and recreation have been growing rapidly in the Tongass National Forest, with attendant greater and varying demand on forest resources as the region changes from commodity production to a different economic base. Residents' and communities' interest in and response to these tourism and recreation increases are complex. This research will provide needed objective information on tourism and recreation not available from other sources.

Project 11: Subsistence Data Gathering and Analysis

Subsistence harvest of fish and wildlife continues to be a key activity in most of the Tongass National Forest. The Alaska National Interest Land Conservation Act (ANILCA) requires the Forest Service to evaluate the impact of its land use actions on subsistence. Additionally, the Federal Subsistence Board has management authority over subsistence hunting and fishing on the Tongass National Forest, and the Forest Service has the main responsibility to collect data needed for management decisions. This long-term project provides for systematic collection and analysis of subsistence data for Tongass National Forest communities.

Objectives: To better understand subsistence harvest and use of fish and wildlife by residents of Southeast Alaska communities, and to examine diachronic changes and trends in subsistence.

Accomplishments: This project supports updating of household-level subsistence harvest data for select communities in Southeast Alaska in FY 1999. This data collection effort takes place on approximately a five-year cycle, with each community's subsistence harvest being measured every five years. Brief reports examining study community subsistence use patterns were completed. In addition, analysis that will synthesize the results of a longer time series of data was initiated.

Benefits to NFS: This project provides data and analysis needed both for forest management objectives and for meeting Federal subsistence management requirements.

Project 12: Traditional Ecological Knowledge

This project explored Tlingit Indian traditional ecological knowledge of the forest and its resources, with an interest in identifying possible relationships between traditional ecological knowledge and scientific understanding of the forest and of forest processes.

Objectives: To review existing literature related to Tlingit Indian knowledge of forest resources. To conduct interviews with Tlingit elders and standard bearers on the themes identified in this literature. To outline directions for further productive research on traditional ecological knowledge topics.

Accomplishments: A literature review was conducted as part of this project. Key respondent interviews were conducted in four Southeast Alaska communities. Final write-up of the results of this exploratory research is underway.

Benefits to NFS: This project provides an approach to understanding the potential use and possible limitations of traditional ecological knowledge.

Project 13: Social Characteristics of Southeast Alaska Communities, Impact of Forest Management, Southeast Alaska Residents Attitudes and Values.

This project examines aspects of the interaction of Southeast Alaska communities with the Tongass National Forest.

Objectives: To develop a research approach to examine community-forest interactions.

Accomplishments: Interviews were conducted in Southeast Alaska communities to identify important community-forest interactions. In collaboration with the University of Alaska, Institute for Social and Economic Research, a survey methodology was developed to measure how Southeast Alaska community members use the forest, their preferences for forest management, and the attitudes and values that underlie these uses and preferences. The survey methodology will allow comparison with earlier studies in Alaska and with similar studies conducted elsewhere. In addition, conceptual work began for a subsequent multi-year study that will track community-forest interactions over time.

Benefits to NFS: This study will lead to a better understanding of how Southeast Alaska residents interact with the forest and encourage development of management approaches more closely aligned with local needs.

Project 14: Product Recovery and Quality from Young-Growth Western Hemlock and Sitka Spruce in Southeast Alaska

Objectives: Determine volume recovery and quality features of young-growth western hemlock and Sitka spruce logs in Southeast Alaska.

Accomplishments: Usable wood volume, lumber grades, and mechanical strength were measured for 278 young-growth trees harvested on Prince of Wales Island. Analysis has been completed and a draft publication prepared. The first draft went through internal review. It was decided to change the publication from a station paper to a journal article. A reformatted and revised draft is nearly complete and ready for external review.

Benefits to NFS: Information on the volume recovery and quality of timber products derived from young-growth stands will aid planners and silviculturists in modeling and designing management actions to maximize benefits from developing young stands.

Project 15: Growth and Yield of Second-Growth Stands developing after Clearcutting on Wetland Soils

Objectives: Evaluate the timber productivity of young-growth stands developing after clearcutting on four organic wetland soil series: Kaikli, Karheen, Kitkun, and Maybeso.

Accomplishments: The study has been completed and a manuscript is in the review process. Results suggest that growth of young stands on these wetland soil sites closely track those predicted for planning purposes. An unanticipated result of the study was the finding that forests in the Region grow on a much broader spectrum of organic soils than previously recognized.

Benefits to NFS: Determine if young stands on these wetland soil types are capable of meeting the minimum volume requirements (20 cubic feet per acre per year at culmination of mean annual increment) for commercial timberland so that a determination can be made as to whether they should or should not be included in the suitable timber base.

Evaluation of Results

Progress on each of the Research studies is progressing as anticipated. None of the preliminary results from the studies have identified any need to change the Forest Plan at this time.

Scenery

Goal: Provide Forest visitors with visually appealing scenery with emphasis on areas seen along the Alaska Marine highway, popular small boat routes and use areas, State highways, major Forest roads, major recreation facilities and from popular recreation places; recognize that in other areas where landscapes are altered by management activities, the activity may visually dominate the characteristic landscape.

Objectives: Manage the scenery of the Forest in order to achieve the following visual quality objectives:

- Retention – 4.8 million acres plus acres of Retention in Wilderness;
- Partial Retention – 3.2 million acres;
- Modification – 0.4 million acres;
- Maximum Modification – 2.8 million acres.

Background: Each land use designation (LUD) in the Forest Plan has a corresponding visual quality objective that defines maximum levels of visual impact desirable from human-induced alterations to the natural landscape character. Associated with each objective is a set of recommended guidelines that includes unit size ranges and type of harvest treatment for different visual absorption capability settings. Also part of the FORPLAN modeling process includes a set of guidelines that define roughly how much of a viewshed (or logical part of a viewshed segment) can be in a "disturbed" condition and still meet the visual quality objective. This monitoring effort is intended to assess whether these guidelines, as applied, actually result in meeting established visual objectives.

Definitions:

Harvest treatment - clearcut, group selection, single-tree selection, diameter-limit partial cut.

Visual Absorption Capability (VAC) - the ability of a landscape to absorb human-caused alterations without changing the natural character of the landscape. There are three classifications - Low, Intermediate, and High. Low VAC landscapes are generally those with steep slopes, minimal terrain and vegetative diversity. High VAC landscapes are those with gentle slopes, and/or high terrain and vegetative diversity.

Monitoring Question: Are the standards and guidelines effective in attaining the adopted Visual Quality Objectives established in the Plan?

To answer this question, four different viewsheds were studied across the Tongass National Forest.

Port Fredrick (Hoonah Ranger District): an area around the Seagull Creek drainage seen from a small boat route in Port Frederick was monitored. This area is allocated to Modified Landscape LUD along the shoreline with an adopted VQO of partial retention, and to Timber Production LUD on the slopes behind the shoreline with an adopted VQO of maximum modification. The harvest that was monitored included a group of units identified in the Alaska Pulp Company Supplemental EIS that were harvested in 1993 and 1995. Most of these units are hidden back up a couple of drainages. One fully visible unit is located on the nose of a ridge directly facing the viewpoint in Frederick Sound. Small portions of a couple of other units are visible. These units were harvested prior to the revision of the Forest Plan, when maximum modification was also the adopted VQO for the area. Most of the units are in an intermediate VAC setting.

Hanus Bay (Sitka Ranger District): a viewshed above Hanus Bay, located just off Peril Strait was monitored. Specific units monitored in this area include a mix of 25-year-old clearcuts, recently harvested clearcuts and an "Alternative to Clearcutting" (ATC) unit harvested in 1997. The 1997 Forest Plan allocates the foreground area to Modified Landscape LUD with a corresponding adopted VQO of partial retention, and the middleground portion of the viewshed to Timber Production LUD with a VQO of maximum modification. The landscape includes a mix of low, intermediate and high VAC settings.

Neets Bay (Ketchikan/Misty Ranger District): a viewshed just inside Neets Bay, on its north shore, just off the West Behm Canal was monitored. Activities monitored included a small amount of harvest cut before 1970, several units cut in the 1970's, and several units cut over the past four years that were part of the North Revilla Timber Sale. The viewshed seen from outside the bay along the Behm Canal is allocated to Modified Landscape LUD with a corresponding VQO of modification in the middleground and partial retention in the foreground. The area well inside Neets Bay is allocated Timber Production LUD and the corresponding VQO's are modification in the foreground and maximum modification in the middleground. The viewpoint analyzed is just inside the entrance to the bay and its viewshed is also part of the area seen from Behm Canal. Hence the units inside this viewshed were designed to meet the modification VQO. The Visual Absorption Capacity (VAC) of the viewshed is combination of low and intermediate VAC because of the varying slopes and aspects.

Bradfield Canal (Wrangell Ranger District): a viewshed on the north side of Bradfield Canal between Blake Channel and Tom Creek was monitored. Activities monitored in this area included the Campbell Creek units that were helicopter logged in 1994 and 1995. All the units were harvested using a form of partial cut that retained all trees under 16 inches in diameter in some cases, and under 12 inches in diameter in others. The viewshed monitored is allocated to Modified Landscape LUD in the current Forest Plan with a corresponding VQO of partial retention in the foreground and modification in the middleground. The landscape monitored is a mix of low and intermediate VAC settings that include steep mid-slopes, flatter slopes near the shore, several pronounced drainages, and degree of vegetative diversity within and along the edges of the alpine zone.

Monitoring Results

Port Frederick: The units monitored range from 70 to 178 acres. Only portions of 3 units are visible. However the largest area of visible harvest is 125 acres in a unit sitting on the nose of a ridge directly facing the viewpoint. This unit is the only really significant area of impact in the viewshed. The total area of visible harvest is 5 percent of the viewshed. The standards and guidelines call for unit sizes of 80 to 100 acres to meet a maximum modification VQO. The major unit in this viewshed is 125 acres. It was determined that this harvest met the maximum modification VQO because of boundary, shape and location changes that were made in the originally planned unit to make it conform to natural features in the landscape surrounding the unit.

Hanus Bay: The combination of the large areas of old clearcuts, the recent clearcuts harvested in 1994 and 1998, and the ATC partial cut unit cut in 1997 add up to about 42 percent of the total viewshed seen from the designated viewpoint. The 25-year-old harvest still creates a major impact because of its size, contrasting light green color, and the very sharp, elongated edge created between the old growth and the young regeneration, which has not grown enough to significantly soften this edge. This older harvest is considered to count as part of the cumulative visual disturbance in this viewshed. The ATC harvest leaves 25 percent of the unit as islands of old growth, and harvests 66 percent of the basal area of the rest of the stand. The combination of these patches of old-growth islands and the individual residual trees left in the rest of the unit significantly soften any edges between the harvest and old growth. The color contrast is also greatly reduced. It appears that the 1994 clearcut (which blends well into the saddle between two ridges), the 1998 clearcut (which straddles a ridge), and the ATC partial cut together with some additional smaller-scale harvest would meet a maximum modification VQO. However, a 42 percent cumulative visual disturbance in a landscape that combines low, intermediate and high VAC settings is too much to meet the maximum modification VQO.



Photo: Hanus Bay

Neets Bay: Most of the visible older harvest occurred during the 1970's. Because the regeneration is hiding all logging debris and beginning to take on a fine-textured appearance, these units have the appearance of a plush carpet with a solid light green color. The recent harvest units are a mix of cable-yarded and helicopter-yarded units. The more visible new units range from about 40 to 60 acres. The two units that sit highest on the slopes are helicopter units. Their visual impact is substantially reduced by the retention of a significant amount of structure scattered throughout most of the units. The retention of these residual trees has greatly softened the edges of the units and reduced the color contrast. The new harvest units are spaced from 800 to almost 2,000 feet apart. A total of 4,314 acres of the viewshed are seen from this one viewpoint. Just over 8 percent of the viewshed, counting only the recent harvest, is visually disturbed. Counting also the older, greened-up clearcuts, the percentage is 14.2 percent.

The overall level of harvest meets the modification VQO, primarily because of the wide dispersal of the new units, the softening effect of the residual trees in the two most visible units, and the amount of green-up that has occurred in the older units. The sizes of the new units (38 and 60 acres) are just within the size range called for in the standard and guidelines for an intermediate VAC setting; however, if the islands and individual trees had not been left in the units, their sizes would have to be a bit smaller to meet the modification VQO. The 40- to 60-acre units, located in primarily intermediate VAC terrain and sitting on a uniformly forested slope, would create too much of a dominating effect to meet the modification VQO.

The overall percentage of disturbance (8.1 percent, counting only recent harvest) is appreciably less than the 20 percent that is estimated in the FORPLAN model (20 percent for a modification VQO in an intermediate VAC). The wide dispersal of the present openings and the impact they create indicate that a few similar additional openings could be strategically placed on these slopes and still meet the modification VQO. However, it appears that in this primarily intermediate VAC landscape a 20-percent cumulative disturbance would be too much to meet modification VQO.



Photo: Neets Bay

Bradfield Canal: The size of the areas treated with the 16-inch and 12-inch diameter-limit cuts range from 6 to 60 acres. Nearly 250 acres, or 8.6 percent of the viewshed from the designated viewpoint, were treated in this manner. The size of the treated areas, their dispersion, and the amount of trees left in each area result in much of the viewshed meeting a partial retention. The 60-acre unit (no. 7) is the one unit, because of the size of the exposed harvested ground that creates too dominating of an impact to allow the overall viewshed to attain the partial retention objective. The larger patches of cleared ground in this treatment area are estimated to be about 10 acres. It was also observed that the cluster of 3 small units (19-1, 19-2 and 19-3) at the far east end of the viewshed, when considered individually, almost meet a retention VQO. The units range in size from 6 to 9 acres, and the residual trees in these units all seem to be well dispersed throughout the units; many seem to have substantial crowns. However, it was noted that if these units were clearcut, they would probably not meet a partial retention VQO in this low VAC portion of the viewshed because of their proximity to each other and the scale of the created openings in a very uniform forest canopy. The standards and guidelines for a partial retention VQO in a low VAC setting call for either group selection partial cuts or clearcuts from 5 to 10 acres in size.

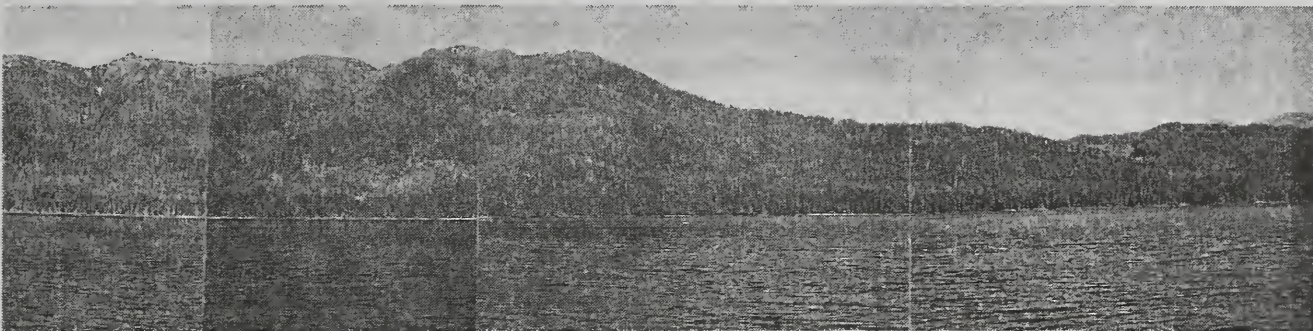


Photo: Bradfield Canal

Evaluation of Results

The following conclusions are drawn from the observations made in the four monitoring efforts described above:

1. Port Frederick monitoring.

- Size guidelines for harvest openings in at least an intermediate and high VAC setting seem to be appropriate (80 to 100 acres in an intermediate and high VAC setting). In some cases, with proper design and location, it may even be possible to exceed the 100-acre guideline.

2. Hanus Bay monitoring.

- The 50-percent cumulative visual disturbance guideline that was established for a maximum modification VQO in an intermediate and low VAC setting may be high. (30 to 35 percent cumulative visual disturbance would be more appropriate.)
- In a low VAC (i.e., very steep, uniform slopes, uniform forest cover), the proper percentage would seem to be roughly 20 to 30 percent. However, monitoring of clearcut harvest activity on a predominantly low VAC landscape would have to be conducted to provide a more definitive conclusion.
- There are no specific guidelines in the Forest Plan that state how large of an area can be treated using partial cut, or what percentage of trees can be harvested. The Hanus Bay ATC unit indicates that retaining 25 percent of an area in islands and leaving one-third of the trees in the remaining 75 percent can result in openings that appear natural to some degree or appear to blend in with the

surrounding landscape, and hence meet a maximum modification VQO or even a modification VQO. Additional monitoring is needed to determine how large these treatment areas can be. The size would depend on the visual objective and the existing character and features of the landscape.

3. Neets Bay monitoring.

- The 40- to 60-acre unit size range for a modification VQO/intermediate VAC setting may be too large (30 to 50 acres is the proper size range).
- Based on observations of portions of the Neets Bay units that are on low VAC slopes, it appears that the size range for the modification VQO in a low VAC setting should be 10 to 30 acres rather than 20 to 40 acres. Additional monitoring of clearcut openings in strictly low VAC settings should be conducted to verify this estimate.

4. Bradfield Canal monitoring.

- The 5- to 10-acre unit size range for a partial retention VQO/low VAC setting may be too large (3 to 6 acres is the proper size range). The treatment of about 8 percent of a low and intermediate VAC landscape with this type of diameter limit cut comes close to meeting a partial retention VQO.
- If these treatment areas were clearcut, the sizes of these units would generally be too large to meet a partial retention VQO. The guidelines estimate a 15- to 40-acre size range to meet partial retention VQO in an intermediate VAC setting. Based on observations of the parts of the units located in the intermediate portions of the landscape, the appropriate size for clearcuts in this type of landscape would be in the lower end of the 15- to 40-acre range. Additional monitoring of clearcut scenarios in both intermediate and low VAC landscapes needs to be conducted to reach a more definitive conclusion.

Note: As with any of these unit size guidelines or cumulative disturbance thresholds, these ranges need to be considered as only an approximate guide. Landscapes are variable, and hence require different design techniques and flexibility in the application of unit size and cumulative visual disturbance guidelines.

Soil and Water

Goals: Maintain soil productivity and minimize soil erosion from land-disturbing activities. Minimize sediment transported to streams from land-disturbing activities. Maintain and restore the biological, physical, and chemical integrity of Tongass National Forest waters.

Objectives: Attain Alaska Region (R-10) Soil Quality Standards. Attain State of Alaska Water Quality Standards.

Background: Implementation of Soil and Water Standards and Guidelines is necessary to maintain soil productivity and water quality. The soil and water Standards and Guidelines are implemented as Best Management Practices (BMPs) described in FSH 2509.22. Region-10 Soil Quality Standards are documented in FSM 2554. Methods for effectiveness monitoring of Soil Quality Standards are referenced in the FSM 2554. Soil conservation practices are practices used to ensure that ground-disturbing activities will meet the R-10 Soil Quality Standards. Typical soil conservation practices include log suspension requirements in timber harvest units and the use of full-bench and end-haul road construction techniques on landslide-prone terrain. Implementation monitoring evaluates whether or not soil conservation practice(s) were required and implemented. Effectiveness monitoring determines whether or not the soil conservation practice used kept the ground-disturbing activity within the R-10 Soil Quality Standard.

The State of Alaska Water Quality Standards set standards for chemical, physical and biologic parameters of waters on National Forest System Lands. The Forest Service in Region-10 uses Best Management Practices and site-specific prescriptions to meet State of Alaska Water Quality Standards when implementing ground-disturbing activities on National Forest System lands.

Soil and Water Question 1: Are the Standards & Guidelines for Soil Disturbance being implemented?

The Best Management Practices (BMPs), described in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22, October 1996), define practices that protect soil and water resources. The Soil and Water Standards and Guidelines define site-specific measures to protect the resources. These standards and guidelines were monitored following a methodology described in the Tongass Monitoring Strategy. The Strategy was developed to provide direction for Tongass Land Management Plan implementation monitoring.

The 1999 BMP Monitoring Report provides details on how the monitoring was conducted. This report is included in the Appendix. Additional information on the implementation monitoring is described in Soil and Water Question 3 and Fish Habitat Question 2. A summary of the findings for the soil resources relative to disturbance is given below.

The BMP implementation monitoring included two distinct efforts: (1) 100 percent monitoring of the units closed out and roads final completed, and (2) 10 percent Interdisciplinary Team (IDT) monitoring. The 100 percent monitoring was conducted primarily by Forest Service sale administrators and engineering representatives, with assistance from resource specialists in a few circumstances. The 10 percent IDT Monitoring was conducted by a team of representatives from the Forest Service as well as other Federal and State agencies. The IDT team included sale administrators, engineers, foresters, planners, and resource specialists from soils, water and fisheries. IDT monitoring was conducted on a stratified random sample made up of more than 10 percent of units and roads monitored during the 100 percent monitoring effort.

The monitoring showed that the Tongass National Forest is implementing the Standards and Guidelines for Soil Disturbance successfully. There were few departures from full implementation that were noted and these departures were, in most cases, corrected prior to the road and unit being finalized or closed. In a few cases, following the monitoring, action plans were developed to complete additional work to fully implement the BMP.

BMPs applicable to soil disturbance:

BMP 13.5 Identification & Avoidance of Unstable Areas
 BMP 12.17 Revegetation of Disturbed Areas
 BMP 13.9 Yarding Systems to Protect Soil/ Water Resources
 BMP 13.11/14 Erosion Control Measures
 BMP 13.11/14 Erosion Control Measures - Temporary Roads
 BMP 14.7 Measures to Minimize Mass Failures
 BMP 14.8 Surface Erosion
 BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation
 BMP 14.12 Control of Excavation & Sidecast
 BMP 14.18 Control Rock Pit Sediment

Monitoring Results

100 Percent Monitoring

The 100 percent monitoring effort consisted of monitoring 66 roads and 106 units. The IDT monitoring effort consisted of monitoring 12 units and 21 specified roads. This monitoring covered 3,250 acres of harvest units. Table 21 shows the number of times the BMPs specific to soil disturbance were monitored relative to the number of times departures from full BMP implementation occurred and corrective action did not bring implementation of the BMP into full compliance with the Standards and Guidelines. As shown on this table, the corrective action applied (in situations where there were BMP departures) brought the implementation into full compliance.

Table 21. BMPs Implemented

| BMPs Applied | Number of Times the BMP was Appropriate for Use | Number of Departures from BMP Implementation | Number of Times Corrective Action Did Not Bring Action into Full Compliance with BMP |
|---------------|---|--|--|
| 13.5 | 29 | 1 (3.4%) | 0 |
| 12.17 | 6 | 1 (16.6%) | 0 |
| 13.9 | 88 | 0 | 0 |
| 13.11; 14 | 126 | 0 | 0 |
| 14.7 | 22 | 0 | 0 |
| 14.8; 12.17 | 46 | 0 | 0 |
| 14.9 | 61 | 1 (1.6%) | 0 |
| 14.12 | 23 | 0 | 0 |
| 14.18 | 34 | 1 | 0 |
| Totals | 435 | 4 (0.9%) | 0 |

In order to comply with the standards and guidelines, the following corrective actions were taken during timber sale administration in individual situations in specific units:

BMP 12.17 Revegetation of Disturbed Areas – A road cut bank was found unseeded but was later seeded so revegetation of the disturbed area was achieved.

BMP 13.5 Identification and Avoidance of Unstable Areas – Yarding system changed to helicopter upon approval of soil scientist to avoid disturbing an unstable area.

BMP 14.18 Control of Rock Pit Sediment – Rock pit used as a waste disposal site to control erosion and sediment transport.

BMP 14.9 Drainage Control Structures to Minimize Erosion and Sedimentation – Stream had been diverted down ditch line; corrective actions were taken to minimize erosion and sedimentation.

Several inconsistencies regarding how the monitoring form was filled out were noted. Confusion was also apparent on several of the forms regarding the fact that units or roads that departed from approved BMPs could be fully in compliance once following corrective actions being implemented.

10 percent IDT Monitoring

The 10-percent IDT monitoring was completed in three geographic areas: Hassler Island, Shrimp Bay, and Etolin Island. Hassler Island and Shrimp Bay are located on the Ketchikan Ranger District, and Etolin Island is located on the Wrangell Ranger District. The Interagency Monitoring and Evaluation Group (IMEG) selected the monitoring locations based upon the significant aspects of the unit harvest and road construction associated with these areas.

Generally, 10-percent quality control monitoring completed by the IDT was in agreement with the monitoring completed by the sale administrator and engineering representative, and showed that the Best Management Practices (BMP) and Standards and Guidelines were being implemented. The roads reviewed at Hassler Island were not complete, so evaluation of the implementation of the BMPs was made at the sites prior to completion and during construction. Post-haul maintenance will be completed on the roads at Hassler Island and Shrimp Bay. The BMPs will be fully implemented prior to road final completion.

In individual situations during the unit and road monitoring, specific concerns relating to the following BMPs were noted. These situations were unique and occurred primarily on the roads and units that were not final completed or the contract did not cover the specified activity (i.e., seeding on a reconstruction contract). The problems were corrected as necessary to comply with the Standards and Guidelines for protection of the soil and water resources:

BMP 13.9 Yarding Systems to Protect Soil/ Water Resources: Partial suspension was prescribed and implemented to provide less than 10 percent soil disturbance.

BMP14.9 Drainage Control Structures to Minimize Erosion & Sedimentation: Additional culverts were added to provide adequate cross drainage.

BMP 14.12 Control of Excavation/ Sidecast: Downslope portion of landing showed bared soil that was seeded to prevent erosion. Road fill slope approached a Class II stream; was slope stabilized to ensure the fill did not encroach upon the stream.

BMP 13.11/14 Erosion Control Measures: Exposed soil slopes were seeded to prevent erosion.

BMP 14.8/ 12.7 Measures to minimize Surface Erosion: Exposed soil slopes in road cut were seeded.

Evaluation of Monitoring Results

The Standards and Guidelines for soil disturbance are being implemented during timber sale administration and road construction. The sale administrators and engineers have a strong understanding of the BMPs and actions necessary to implement the associated Standards and Guidelines. Continued emphasis is necessary on adequate culvert installations and spacing, and seeding exposed soil slopes. Application of partial suspension and full suspension has contributed to limit soil disturbance.

Specific details on the implementation monitoring completed in fiscal year 1999 is described in the annual BMP monitoring report, which is included in the Appendix. BMP implementation monitoring is also discussed in Soil and Water question 3, Fish question 2, and Wetlands question 1. We recommend combining the implementation monitoring into one question.



Soil and Water Question 2: Are the Standards and Guidelines Effective in Meeting Alaska Regional Soil Quality Standards?

Soil and water effectiveness monitoring is completed through monitoring the soil quality standards as described in Forest Service Manual 2554, and is summarized in this report.

This question is addressed in two parts: 1) soil disturbance; and 2) landslide inventory.

Soil Disturbance

The specific monitoring completed is effectiveness monitoring of BMP 13.9, "Determining Guidelines for Yarding Operations". The amount and type of soil disturbance were measured along transects within timber harvest units to determine compliance with established Soil Quality Standards. Region 10 Soil Quality Standards describe the allowable levels of change in soil properties within an activity area such as a harvest unit. They are intended to provide reasonable assurance that no long-term loss in inherent soil productivity will result if the standards for severity and areal extent of soil disturbances are met.

Soil disturbance was first monitored on the 89-94 KPC long-term timber sale area during the summer of 1990. The 89-94 FEIS monitoring plan required soil disturbance monitoring in selected harvest units following harvest. The 89-94 FEIS also established soil disturbance objectives within harvest units receiving partial suspension, full suspension, or no suspension.

Initial efforts focused on evaluating soil disturbances caused by shovel yarding. Line transects 100 yards in length were located on the contour and used for the first three summers of monitoring. Methods were revised in 1993 to improve randomness of transect location and to collect additional data necessary to compare results to the Region 10 Soil Quality Standards.

By 1993, soil disturbance data was indicating a need to monitor soil disturbance on steeper slopes. A random sample of steep slope units was monitored over the next three years and a final report written in January 1997. Difficulty was encountered when trying to complete randomly located transects on

extremely steep slopes with broken terrain. An alternative method of soil disturbance monitoring was tried using low-elevation oblique air photos (Landwehr 1994).

A total of 31 miles of transects were completed in 56 harvest units on the 89-94 KPC long-term timber sale area. Of these transects, 249 (4.7 miles) were completed in 23 selected steep-slope harvest units. The results are listed in Tables 22 and 23. A total of 10 harvest units were completed on independent timber sales and ALP long-term sale units on the Wrangell and Petersburg Ranger Districts in 1993 and 1994. No new data was collected in FY 1999.

A statistical review of the two sets of soil disturbance data from the 89-94 KPC Operating Area was completed in January and February of 1999. The results of the statistical review were documented in a 5-page white paper, and presented to the Tongass NF soil scientists in March of 1999 (Landwehr and Nowacki, 1999).



Monitoring Results

The Regional Soil Quality Standards allow up to 15 percent of an activity area (harvest unit) to be in a detrimental soil condition. Data in Table 22 indicates that both full and partial suspension are well within this standard.

Table 22. Mean Soil Disturbance levels on 23 steep-slope harvest units (249 transects).

| Treatment | Number of units | Total Disturbance | Confidence Interval | Detrimental Disturbance | Confidence Interval |
|--------------------|------------------------|--------------------------|----------------------------|--------------------------------|----------------------------|
| Partial Suspension | 12 | 6.4% | 1.3 | 3.0% | 1.5 |
| Full Suspension | 11 | 2.9% | 1.5 | 1.8% | 1.4 |

Data on shovel yarding presented in Table 23 indicates that this is also well within the standard, as detrimental soil disturbance cannot exceed total disturbance. Mean values are all well within established standards, and no individual harvest unit has exceeded the standard. Soil displacement was the most common soil disturbance, accounting for 79 percent of the detrimental impacts documented (Landwehr, 1997).

Table 23. Mean Soil Disturbance levels on the total 31 miles of transect in 56 harvest units.

| Treatment | Number of Units | Total Disturbance | Confidence Interval |
|--------------------|------------------------|--------------------------|----------------------------|
| Shovel Yarding | 8 | 4.8% | 2.1 |
| Partial Suspension | 35 | 5.7% | 1.3 |
| Full Suspension | 13 | 2.6% | 1.5 |

Evaluation of Results

Considering the monitoring results, Tongass NF soil scientists concluded that the existing body of data is adequate to answer Soil and Water Question 2, and specific monitoring of field activities for soil disturbance effectiveness relative to suspension requirements for harvest systems is not necessary. The Standards and Guidelines are effective in meeting Alaska Regional Soil Quality Standards.

The soil scientists recommended that further data collection should be considered to evaluate individual harvest units where soil disturbance problems are identified or to evaluate the effects of new or different logging techniques. Development of protocols for this monitoring is anticipated in fiscal year 2000. These protocols will be incorporated into the fish and riparian synthesis monitoring effort.

Landslide Inventory Guidelines

The specific monitoring completed is effectiveness monitoring of BMP 13.5, "Identification and Avoidance of Unstable Areas" and BMP 14.7, "Measures to Minimize Mass Failures." This monitoring included evaluation from two landslide inventories: one inventory that included site visits to 89-94 harvest areas and one inventory of air photos of 89-94 harvest areas.

A landslide inventory of the 89-94 KPC Operating Area documented 162 landslides associated with timber harvest and road construction activities. The landslides were documented during project implementation, and all units were revisited 3 years after harvest completion. Length and width of each landslide was measured with a cloth tape, and slope initiation angle measured to the nearest percent. The transect inventory was completed in 1998. A report entitled "Inventory and Analysis of Landslides Associated with 89-94 KPC LTS Units and Roads On the Thorne Bay Ranger District" was completed in February 1998, and the data presented to the Tongass soil scientists in March 1999.

A second landslide inventory was completed using air photos covering the 89-94 project area. This report analyzed landslide frequency on the 89-94 project area over time to determine if current management practices are resulting in more or less management-induced landslides (Landwehr, 1998).

Monitoring Results

In the transect landslide inventory, the 162 documented landslides averaged a half acre in size. Fifty-four of the slides occurred during a single storm event in October of 1993. Forty-seven slides were associated with road construction, 13 slides with rock pit development, and 102 slides with harvest units. The landslides represent approximately 18,428 acres of timber harvest and 222 miles of specified road construction. The total area impacted by the landslides was 76.5 acres. Six of the slides directly entered fish habitat. (For further details of this monitoring, see Landwehr 1999.)

The aerial photo inventory covering the 89-94 project area provides evaluation of unstable areas and mass movement relative to harvest activity. The evaluation of this inventory data related the landslide frequency and management practices. A report was written that documents the analysis of landslide frequency over time specific to whether management practices are resulting in more or less management-induced landslides (Landwehr, 1998).

Evaluation of Results

At this time the Tongass soil scientists agree that additional landslide inventories and data gathering are needed to adequately answer this monitoring question. The reports, referenced in the previous section, provide some preliminary indications of landslide extent and occurrence relative to the effectiveness of our identification of unstable areas and measures to minimize mass failures. A landslide inventory protocol for monitoring the effectiveness of BMP 13.5 is being developed. Additional landslide inventory work is anticipated to continue in fiscal year 2000.

At a March 1999 meeting, the soil scientists suggested additional data analysis items for the existing landslide data. Data analysis that provides identification of the "statistical break" for landslide initiation angles in harvest units was recommended. This data analysis requires a slope gradient map with relatively detailed slope breaks. At this time a slope gradient map of sufficient detail is not available. To build an adequate slope gradient map for the analysis, 40-foot contour maps are needed in a GIS format. Data for 40-foot contours are available for the 646,624 acre 89-94 KPC project area, but currently are not in a GIS format.

Soil and Water Question 3: Are Best Management Practices being implemented?

The Best Management Practices (BMPs) were monitored on the Tongass National Forest, using guidelines described in the Tongass Monitoring Strategy. The strategy was developed to provide direction for TLMP implementation monitoring. An interagency team of representatives from the Forest Service and Alaska Department of Environmental Conservation selected specific BMPs to be monitored, based upon potential risk factors to soil and water resources. Members of the Monitoring and Evaluation Group (IMEG) then reviewed their selection. The BMPs evaluated are included in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22, October 1996). The 1999 BMP Monitoring Report contains details on how the monitoring was conducted. This report is included in the Appendix.

The BMP implementation monitoring included two distinct efforts: (1) 100 percent monitoring of the units closed out and roads final completed, and (2) 10 percent Interdisciplinary Team (IDT) monitoring. The 100 percent monitoring was conducted primarily by Forest Service sale administrators and engineering representatives, with assistance from resource specialists in a few circumstances. The 10 percent IDT monitoring was conducted by a team of representatives from the Forest Service as well as other Federal and State agencies. The IDT team included sale administrators, engineers, foresters, planners, and resource specialists from soils, water and fisheries. IDT monitoring was conducted on a stratified random sample made up of more than 10 percent of units and roads monitored during the 100 percent monitoring effort

The monitoring showed that the Tongass National Forest is implementing the Standards and Guidelines for Soil Disturbance successfully. There were few departures from full implementation that were noted

and these departures were, in most cases, corrected prior to the road and unit being final completed or closed. In a few cases, following the monitoring, action plans were developed to complete additional work to fully implement the BMP.

Monitoring Context

Planning for some of the roads and units was completed before the Soil and Water Conservation Handbook was revised in October 1996, and new Forest Plan Standards and Guidelines were approved in May 1997. Both documents included many improvements for protecting soil and water resources. Several important changes in the 1996 Soil and Water Conservation Handbook include improving wetlands management direction, considering stream buffer windthrow, and generally making Forest Service BMPs consistent with State Forest Practices Regulations (see Appendix 2). A few of the important changes included in the 1997 TLMP FEIS and the revised Forest Plan Standards and Guidelines resulted in new stream class definitions, and stream protection measures required for each stream class and channel type. Buffer strip protection of Class III streams was entirely new.

BMPs applicable

BMP 12.6 Riparian Area Designation & Protection
BMP 12.6a Buffer Zone Design & Layout
BMP 12.17 Revegetation of Disturbed Areas
BMP 13.16 Stream Channel Protection
BMP 13.9 Yarding Systems to Protect Soil/ Water Resources
BMP 13.11/14 Erosion Control Measures
BMP 12.5 Wetlands Protection Measures
BMP 14.6 Timing Restrictions for Construction Activities/ Fisheries Prescription
BMP 13.11/14 Erosion Control Measures- Temporary Roads
BMP 12.8 Oil Pollution Control Measures
BMP 14.7 Measures to Minimize Mass Failures
BMP 14.8 Surface Erosion
BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation
BMP 14.12 Control of Excavation & Sidecast
BMP 14.14/ 14.17 Bridge/ Culvert Design, Installation & Removal
BMP 14.18 Control Rock Pit Sediment
BMP 14.19 Disposal of Slash & Stumps
BMP 14.20/ 14.22 Road Maintenance Access Management

100 percent Monitoring

Monitoring Results

The 100 percent monitoring effort is summarized in Table 24. This table displays the total number of times each specific BMP was rated, the number of times it was fully implemented, number of times it showed a departure from full implementation, and the number of times departures from full implementation of BMPs were corrected. In most cases where departures were observed, corrective action was taken so that the BMP was fully implemented before the unit or road was approved by either the sale administrator or contracting officers representative. In a few cases, the monitoring resulted in action plans being drawn up to complete additional work so the BMP would be fully implemented.

Table 24. Summary of BMP Use, Number of Departures, and Corrective actions

| BMPs Applied | Number of Times the BMP was Appropriate for Use | Number of Departures from BMP Implementation | Number of Times Corrective Action Did Not Bring Action into Full Compliance with BMP |
|---------------------|--|---|---|
| 13.5 | 29 | 1 (3.4%) | 0 |
| 12.6; 12.6a | 42 | 8 (19%) | 3 (7.1%)* |
| 12.61 | 55 | 0 | 0 |
| 12.17 | 6 | 1 (16.6%) | 0 |
| 13.16 | 79 | 0 | 0 |
| 13.9 | 88 | 0 | 0 |
| 13.10 | 95 | 1 (1.1%) | 0 |
| 13.11; 13.14 | 126 | 0 | 0 |
| 12.5 | 44 | 0 | 0 |
| 14.6 | 36 | 1 (3.8%) | 0 |
| 14.5 | 90 | 0 | 0 |
| 12.8 | 109 | 1 (0.9%) | 0 |
| 14.7 | 22 | 0 | 0 |
| 14.8; 12.17 | 46 | 0 | 0 |
| 14.9 | 61 | 1 (1.6%) | 0 |
| 14.12 | 23 | 0 | 0 |
| 14.14; 14.17 | 44 | 0 | 0 |
| 14.18 | 34 | 1 | 0 |
| 14.19 | 55 | 0 | 0 |
| 14.20; 14.22 | 60 | 0 | 0 |
| Totals | 1,125 | 14 (1.2%) | 3 (0.2%) |

*6 trees were harvested from one Class II buffer and 4 trees from one Class II, blue-and-white flagged TTRA buffer.

Evaluation of Results

The results show that the Tongass has successfully implemented the Best Management Practices (see Table 24 above). A total of 3,250 acres were reported as having been harvested in 106 units, and 66 road segments were constructed or reconstructed in 1999. Average unit size was 31 acres. Action was taken during the road construction and unit harvest to correct situations where departures from BMP implementation occurred. In most situations, this action resulted in full implementation of the BMPs.

Departure from BMP implementation was reported a total of 16 times. BMP 12.6, Riparian Area Designation and Protection, was reported 7 times, and BMP 12.6a, Buffer Zone Design and Layout was reported once. In all but three cases, corrective action was successful in bringing the units and roads into full compliance. Full compliance was not obtained where 6 trees were harvested within a Class II buffer and 4 trees were harvested within a Class II, blue-and-white flagged TTRA buffer. Compliance with the standards and guidelines requirement for minimum buffer was achieved although, because the Class II buffer was greater than 120 feet. Full compliance for BMP 12.6 and 13.10, Landing Location and design, was not obtained in one unit where a helicopter landing was located within a Class I stream buffer.

As shown in Table 24, only 14 departures from full BMP implementation occurred out of 1,125 applications of the BMPs during the implementation monitoring, and in only 3 situations did the corrective action not result in full implementation of the Standards and Guidelines. Corrective actions were taken to fully implement the BMPs as listed. The specific corrective actions are detailed in the annual implementation monitoring report.

Corrective actions were noted in each of the following:

BMP 12.8: Oil Pollution Control Measures
BMP 13.11/14: Erosion Control Measures
BMP 12.17: Revegetation of Disturbed Areas
BMP 13.5: Identification and Avoidance of Unstable Areas
BMP 14.18: Control of Rock Pit Sediment
BMP 14.6: Timing Restrictions for Construction Activities/Fisheries Prescription
BMP 14.9: Drainage Control Structures to Minimize Erosion and Sedimentation

10 percent IDT Monitoring

Monitoring Results

The 10-percent monitoring was completed in three geographic areas: Hassler Island, Shrimp Bay, and Etolin Island. Hassler Island and Shrimp Bay are located on the Ketchikan Ranger District, and Etolin Island is located on the Wrangell Ranger District. The Interagency Monitoring and Evaluation Group (IMEG) selected the monitoring locations based upon significant aspects of the unit harvest and road construction associated with these areas.

Generally, 10 percent quality control monitoring completed by the IDT was in agreement with the monitoring completed by the sale administrator and engineering representative, and showed that the BMPs were being implemented. The roads reviewed at Hassler Island were not complete, so evaluation of the implementation of the BMPs was made at the sites prior to completion and during construction. Post-haul maintenance will be completed on the roads at Hassler Island and Shrimp Bay. The BMPs will be fully implemented prior to road final completion.

During IDT monitoring, the group noted identified strengths associated with BMP implementation and a few BMPs that need continued emphasis. Identified strengths of BMP implementation included:

BMP 12.6/ 12.6a: Riparian Area Designation and Implementation of Buffers
BMP 12.6a: Stream Channel Protection
BMP 13.9: Yarding Systems to Protect Soil and Water Resources
BMP 13.10: Landing Locations & Design
BMP 14.6: Timing Restrictions for Construction Activities/ Fisheries Prescription
BMP 14.14/ 14.17: Design and Installation of Culverts
BMP 13.11/ 13.14, 14.5: Erosion Control Measures
BMP 14.26/ 14.27: Surface Erosion Control, Storm Water Pollution Prevention Plans
BMP 14.26/ 14.27: Oil Pollution Control Measures.

Overall, the sale administrators and engineering representatives demonstrated diligence in implementing appropriate protection of the stream courses, as well as prescribed suspension, effective culvert installation, and minimization of sedimentation. The terrain in some of these units and along the road corridors was excessively steep, requiring extensive efforts on the part of the sale administrators and engineering representatives to implement the BMPs.

There were several cases where concerns were identified during the 10-percent IDT monitoring. Most of this monitoring was completed on roads and units that were not final completed and closed out. The IDT listed the BMP implementation as being in Departure from Full BMP Implementation in 4 units and 6 roads of the 10 units and 21 road segments, 3 LTFs, and 1 log loading equipment area monitored. These departures were corrected prior to the road and unit final closure. The specific comments were noted in the annual monitoring report, which is included in the Appendix.

During completion of the roads and post-haul maintenance, continued focus should be directed toward Best Management Practices to ensure adequate numbers and spacing of drainage control structures to minimize erosion and sedimentation, control of excavation/ sidecast, road/ ditch maintenance, and

seeding. The BMPs listed below need continued emphasis when implemented during road construction and timber harvest activities:

BMP 12.6a: Buffer Zone Design and Layout
BMP 13.9: Yarding Systems to Protect Soil/ Water Resources
BMP 13.11/ 13.14: Erosion Control Measures
BMP 14.8/ 12.7: Measures to Minimize Surface Erosion
BMP 14.9: Drainage Control Structures to Minimize Erosion & Sedimentation
BMP 14.12: Control of Excavation/ Sidecast
BMP 14.14/ 14.17: Bridge and Culvert Design, Installation and Removal
BMP 14.19: Disposal of Slash and Stumps
BMP 14.20/ 14.22: Road Maintenance/Access Management

Evaluation of Results

The monitoring showed the Tongass National Forest is implementing the Best Management Practices successfully. There was general agreement between the 100 percent monitoring effort and the 10 percent IDT monitoring effort. There were few departures from full BMP implementation noted, and these departures were corrected prior to road and unit final inspections, with the exception of the departures that occurred on the buffers and stream crossings. Mitigation measures were employed in these cases to ensure damage did not occur to the resources, and that the Standards and Guidelines were implemented.

Recommendations from the 100 percent and 10 percent IDT monitoring effort included:

- Modifying the implementation monitoring form;
- Altering the random stratification for the unit and road pool selection;
- Changing the structure/ function of the IDT monitoring trips;
- Emphasis on adequate numbers and spacing of drainage control structures to minimize erosion and sedimentation, control of excavation/ sidecast, road/ ditch maintenance, seeding;
- Compliance with buffer and crossing requirements on Class I and II streams; and
- Emphasis on oil pollution control, erosion control, landing location.

The IDT made some specific recommendations relative to the specific wording and numerical entries on the implementation monitoring form. The group supported the random stratified method of unit/ road selection for the trip with an emphasis on steep slopes, and presence of Class I and II streams. The IDT group recommended a two-tier group to conduct the monitoring: (1) a large group to look at controversial or new Standards and Guideline applications when actually implemented during road construction and unit harvest; and (2) a smaller group to actually complete the 10 percent IDT monitoring. Since the IDT monitoring was completed on some roads and units prior to final completion, the group had the opportunity to recognize the items addressed during routine contract administration. They identified the need to emphasize road drainage control, post haul maintenance, seeding and riparian buffer implementation. Details of these recommendations can be found in the annual implementation monitoring report that is included in the Appendix.

Soil and Water Question 4: Are Best Management Practices effective in meeting water quality standards?

Goal: Protect beneficial uses of water including drinking water and growth and propagation of fish, other aquatic life and wildlife.

Objective: Study a representative sample of project, where BMPs have been fully implemented to determine if BMPs are effective in meeting State water quality criteria (e.g., turbidity, sediment, temperature) or in maintaining physical habitat condition (e.g., gravel embeddedness, pool depth).

Background: Forest roads can have adverse effects on aquatic life resulting from accelerated erosion and sediment loading; alteration in natural drainage patterns; changes in channel morphology, and increased risk of chemical spills and contamination (Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats, 1991). Recent water quality monitoring on the Tongass has focused on the effectiveness of the road BMPs because of the potentially significant effect on stream beneficial uses, especially the growth and propagation of aquatic organisms. Two types of road-related water quality monitoring were conducted in 1999: 1) Direct measurement of stream turbidity water quality criteria, 2) Indirect measurement of road erosion sources through road condition surveys. The stream turbidity monitoring addresses site-specific, short-term water quality issues, while the road condition information can be used to assess relative risk of long-term cumulative effects of roads on water quality and aquatic habits.

Road Condition Monitoring

The Alaska Region Road Condition Survey (FSH 7709.58-99-1) is a comprehensive survey for identification and prioritization of forest road maintenance needs, and assessment of BMP implementation and effectiveness. The road condition data can provide qualitative assessment of BMP effectiveness using indices such as the frequency of culvert washouts or frequency and size of mass soil movement associated with roads. Interpretation of this data is greatly enhanced when referenced to long-term aquatic and riparian habitat condition indices in the same watershed. This relationship is described in the Fish Habitat Question 3 that addresses habitat effectiveness.

The Road Condition Survey can be used to perform effectiveness monitoring for the following BMPs:

| | |
|-----------|---|
| BMP 14.22 | Access and Travel Management |
| BMP 14.20 | Road Maintenance |
| BMP 14.7 | Measures to Minimize Mass Failures |
| BMP 14.8 | Measures to Minimize Surface Erosion |
| BMP 12.17 | Revegetation of Disturbed Areas |
| BMP 14.12 | Control of Excavation and Sidecast Material |
| BMP 14.9 | Drainage Control to Minimize Erosion and Sedimentation |
| BMP 14.14 | Control of In-channel Operations |
| BMP 14.17 | Bridge and Culvert Design and Installation |
| BMP 14.18 | Development and Rehabilitation of Gravel Sources and Quarries |

Road Condition Survey Results:

At this time results pertaining to water quality issues have not been compiled from the Tongass NF road condition database. Future work should focus on these data analyses, and the reporting of issues to insure that BMP water quality information needs are adequately addressed.

Over the past two years approximately 2,000 miles of road have been surveyed on the Tongass National Forest. These road condition surveys have focused on forest system road segments. The program goal is to complete surveys on all system roads and temporary roads within five years.

Analysis of the road condition database for the Tongass has been limited to fish passage parameters. No comprehensive analysis of the data has been conducted to date for other purposes, including effectiveness of road drainage and erosion control BMPs.

Evaluation of Results

Initial road condition survey efforts have focused on design of the database and collection of field information to enter into the database. Future work must focus substantial effort toward applications and uses of road condition survey data. Standard data reporting formats are needed to summarize key indices of BMP effectiveness, such as length of ditch erosion, frequency of functional cross drains per mile, number (and potential number) of diverted stream channels, number of cut and fill slope mass failures per mile, number of damaged road drainage structures, and area of un-vegetated road cut slopes. Data should be summarized and reported by road segment (mileposts), watershed (6th level HUC [hydrologic unit code]) and ranger district.

Stream Turbidity

Stream turbidity monitoring during in-stream activity is a simple, low-cost observation of a water quality standard. This monitoring provided information relative to water quality standards, and responds to routine effectiveness monitoring commitments in the USDA Forest Service Memorandum of Agreement with the Alaska Department of Environmental Conservation (1992).

The basis of the turbidity sampling procedure is to determine if Best Management Practices are effective in preventing water quality degradation, using turbidity as the sole parameter of water quality. According to the Alaska Forest Resources & Practices Regulations (11AAC95), "degradation of water quality" means a decrease in water quality such that the affected waters are unable to fully maintain existing or designated uses; it does not include decreases in water quality that are temporary, localized, and reparable. 11AAC95 defines "temporary" as 48 hours or less and "reparable" as an effect that is reversible by natural processes, such that the designated use will return to a state functionally identical to the original.

The Monitoring and Evaluation Guidebook provides the turbidity sampling procedures. The Interagency Monitoring and Evaluation Group (including representatives from the Environmental Protection Agency and the Alaska Department of Environmental Conservation) developed these procedures with an underlying assumption that the evaluation criteria for turbidity would be based on the beneficial use of water for "growth and propagation of fish, shellfish, other aquatic life, and wildlife." The Alaska Water Quality Standards (18AAC70, as amended through May 27, 1999) require that, with respect to this "aquatic life" designated beneficial use, turbidity levels may not exceed 25 NTU (nephelometric turbidity units) above natural conditions; for all lake waters, the levels may not exceed 5 NTU above natural conditions. The monitoring data presented in this report was collected with an understanding that stream turbidity levels not exceeding 25 NTU within 48 hours of culvert installation would meet the State water quality standards.

The Alaska Water Quality Standards require that the most stringent criteria for water quality apply to streams unless a variance to change the designated use is granted. The most stringent criteria is "water supply (i) drinking, culinary, and food processing." These standards state that turbidity "may not exceed 5 NTU above natural conditions when the turbidity is 50 NTU or less, and may not have more than 10 percent increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 25 NTU".

Because the Forest Service (and the Interagency Group) had assumed that the appropriate and most reasonable beneficial use for most remote streams on the national forest is "aquatic life," this report presents results for both "water supply (i)" and "aquatic life" criteria.

Monitoring Results

Turbidity was measured at three stream crossings installed on the Nemo Loop Road (Road 6267) on Wrangell Island. At the time of this report, only two other major stream culverts (48 inches or larger) have been installed this season on the Wrangell Ranger District. Therefore, this effort represents a 60 percent sample of all stream-crossing installations on the District. The table below displays culvert and stream channel information for each sample site. All drainage structures are round corrugated metal pipes (CMPs).

Table 25: Culvert and Stream Channel Information (Road No. 6267).

| Road Survey Station | CMP Dia. | Stream Class | Fish Species Verified | Channel Type | Upstream Bankfull Width (ft.) | Dominant Substrate | Channel Gradient |
|---------------------|----------|--------------|-----------------------|--------------|-------------------------------|--------------------|------------------|
| 39+21 | 96" | II | cutthroat trout | HC2 | 6 | cobble | 8% |
| 59+77 | 72" | III | no fish | HC2 | 10 | cobble | 12% |
| 62+74 | 48" | III | no fish | HC2 | 10 | boulder | 15% |

The table below displays structure installation and turbidity measurement information. Precipitation data were collected at a site approximately eleven miles north of the project area. Steady rain resulted in high stream flows during all installations except for Station 39+21, which was installed during a brief interval of drier weather. The road was subject to heavy traffic (rock haul) during the period when turbidity samples were collected. Turbidity samples were collected approximately 42 hours, 49 hours, and 3 hours, respectively, after completing structure installation.

Table 26: Background Information for Installation and Turbidity Measurements (Road No. 6267).

| Road Survey Station | Date & Time CMP Installation Complete | Approx. 24-hour Antecedent Precipitation for Installation (in.) | Date & Time Turbidity Measured | Approx. 24-hour Antecedent Precipitation for Turbidity Measurement (in.) | Stream Flow Conditions During Turbidity Measurement |
|---------------------|---------------------------------------|---|--------------------------------|--|---|
| 39+21 | 1 Oct 99, 1430 | 0.08 | 3 Oct 99, 1000 | 0.86 | bankfull flow |
| 59+77 | 12 Oct 99, 1330 | 0.21 | 14 Oct 99, 1440 | 0.81 | slightly less than bankfull |
| 62+74 | 14 Oct 99, 1200 | 0.81 | 14 Oct 99, 1435 | 0.81 | slightly less than bankfull |

The table below displays monitoring results. In all cases, turbidity samples were measured as aliquots of water samples collected upstream of disturbance and within 20 feet downstream of the culvert outlet. A Hach 2100P Portable Turbidimeter was used to measure turbidity at the site immediately after the water sample was obtained. Downstream turbidity levels were within 25 NTU of upstream ("natural") levels at each site. Downstream turbidity levels were within 5 NTU of upstream at two of the three sites.

Table 27: Turbidity Results (Road No. 6267).

| Road Survey Station | Upstream Turbidity (NTUs) | Downstream Turbidity (NTUs) | Water Quality Standard "Water Supply (i)" Achieved (yes/no) | Water Quality Standard "Aquatic Life" Achieved (yes/no) |
|---------------------|---------------------------|-----------------------------|---|---|
| 39+21 | 1.12* | 1.19* | Yes | Yes |
| 59+77 | 0.42 | 0.45 | Yes | Yes |
| 62+74 | 0.24 | 14.2* | No | Yes |

*Value represents average of at least two aliquots from sample bottle

Evaluation of Results

Turbidity measurements taken at stream crossings during construction of the Nemo Loop Road on Wrangell Island indicate that the State water quality standard for "water supply (i)" was achieved at two of three sites monitored. The standard for "aquatic life" was achieved at all three sites. The Best Management Practices employed at these sites are effective in preventing water quality degradation of the turbidity parameter when evaluated for the existing use of "aquatic life." Based upon this initial study, no changes in BMPs are recommended.

The State water quality standard for "water supply (i)" was achieved within approximately 48 hours at two of three sites monitored. Given the site conditions and results from other sites, it is likely that the third site returned to within 5 NTU of upstream by the following day. State water quality standards for "aquatic life" were achieved at all three sites. The Best Management Practices employed at these sites are effective in preventing water quality degradation of the turbidity parameter when evaluated for the existing use of "aquatic life."

Additional monitoring data would be useful to determine if the BMPs are effective in preventing water quality degradation of the turbidity parameter when evaluated for the designated use of "water supply (i)." The Guidebook will be modified to reflect that the correct evaluation criterion for turbidity is the "water supply (i)" standard of 5 NTU.



SUBSISTENCE

Goal: Provide for, "... the continuation of the opportunity for subsistence uses by rural residents of Alaska"...(Public Law 96-487--DEC. 2, 1980, Sec.801)

Objectives: Evaluate and consider the needs of subsistence users in making project land management decisions.

Develop a template that identifies a range of activities conducted/completed throughout the year that will be the format for reporting subsistence monitoring associated with TLMP.

Background: The Alaska National Interest Lands Conservation Act (ANILCA, 1980) requires a priority for subsistence uses by rural residents on Federal public land in Alaska (TITLE VIII). Since 1990, the Federal Government has been managing resources for subsistence use on Federal public lands through the Federal Subsistence Board.

Several pieces of legislation and sets of regulations provide the framework of our legal responsibilities. These are:

- Title VIII of ANILCA;
- Federal Subsistence Management Regulations (36 CFR 242 or 50 CFR 100);
- Federal Advisory Committee Act (FACA); and
- Federal Advisory Committee Management Regulations (41 CFR 101-6).

Current Situation: In 1995, the Ninth Circuit Court of Appeals ruled that the existing scope of the subsistence program should be expanded to include "...those navigable waters in which the United States has an interest by virtue of the reserved water rights doctrine." Subsistence management of these waters became effective in October 1999.

Subsistence Question: Are the effects of management activities on subsistence users in rural Southeast Alaska communities consistent with those estimated in the Forest Plan?

Monitoring Results

The known effects of management activities on subsistence users (rural residents as defined in ANILCA) have not been determined to be inconsistent with the Forest Plan.

The TLMP FEIS Record of Decision, signed in April 1999, included direction intended to reduce impacts on subsistence users and subsistence resources. The subsistence monitoring program will be expanded to determine the effects of management activities on subsistence users in light of this new direction.

As a first step, a group of several Forest Service specialists conducted a workshop in FY 99 during which work was completed to evaluate monitoring subsistence issues and identify needed changes to the subsistence monitoring processes and reporting format. At the meeting, these specialists developed a template to utilize in facilitating future TLMP Monitoring reporting. This template is displayed on the following page.

SUBSISTENCE MONITORING REPORT TEMPLATE

- I. Communications, Consultations, and Contacts.
 - A. Scoping/Collaborative Stewardship summary.
 - 1. NEPA Scoping - Subsistence portions.
 - 2. Communications with community leaders regarding subsistence issues.
 - 3. Consultations with Federally recognized Tribes regarding subsistence issues.
 - 4. Efforts to capture traditional environmental knowledge, such as Dog Point Camp.
 - 5. Comments from Native (e.g., Sitka Tribal Association) and non-Native groups (e.g., SEACC) regarding subsistence issues.
- II. Subsistence 810 Hearings, Studies, TRUCS, and Regional Advisory Council Meeting Summaries.
 - A. Subsistence 810 Hearing(s) Summary.
 - 1. Number of hearings, dates, locations, number of participants, project association.
 - 2. Subsistence issues raised at the hearings.
 - B. Administrative study summary.
 - 1. Submitted by Forest Science Lab.
 - C. TRUCS updates and summaries.
 - 1. Submitted by the State of Alaska.
 - D. Regional Advisory Council (RAC).
 - 1. Summary of RAC Annual Report.
 - a. Submitted by Forest Subsistence Coordinator.
 - 2. Summary of Federal Subsistence Board response to RAC Annual Report.
 - a. Submitted by Forest Subsistence Coordinator.
- III. Alaska Department of Fish and Game and Other State Agency Data Summaries.
 - A. Wildlife Harvest Data Summary.
 - B. Fish Harvest Data Summary.
 - 1. Commercial fish.
 - 2. Sport fish.
 - C. Division of Subsistence Data Summary.
 - D. Department of Labor Census Data.
- IV. USDA Forest Service Data Summary.
 - A. District/Office Data Summary.
 - 1. Deer jawbone/teeth data.
 - 2. Leg bone/fat analysis data.
 - 3. Pellet count/mortality survey data.
 - 4. Other cooperative study data.
 - 5. Petersburg R.D. marten study data.
 - 6. Petersburg R.D. deer study data.
 - 7. Petersburg R.D. wolf study data.
 - 8. Thorne Bay R.D. Heceta Island deer study data.

Evaluation of Results

In the future, utilization of the subsistence monitoring report template in data collection and reporting should facilitate a more in-depth description of the effects of management activities on subsistence users. This detailed information will provide the data necessary to further evaluate the effects anticipated in the Forest Plan, and determine consistency with the plan.



Timber Management

Goal: Maintain and protect multiple use values and resources in harvest areas. Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner.

Objective: Determine whether standards and guidelines are being followed in harvest areas. Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the market demand for the planning cycle, up to a ceiling of the Forest Plan's allowable sale quantity (ASQ).

Background: This monitoring is designed to determine if standards and guidelines are being followed with regard to maximum opening size limits, harvest dispersion, harvest on steep slopes (in excess of 72 percent), and protection of beach and estuary fringes for wildlife and fisheries resources. This monitoring question overlaps with soil and water, karst, wetlands, transportation and fish monitoring.

Timber Monitoring Question 1: Are timber harvest activities adhering to applicable timber management Standards and Guidelines?

Timber question 1 addresses the limitation of created openings greater than 100 acres and the 1,000-foot beach and estuary buffer requirement. All harvest unit locations are entered in the Forest's geographic information system (GIS). These units were compared to the 1,000-foot beach and estuary buffers to determine if they infringed on the buffer zones. In addition, unit size is tracked (see timber monitoring question 6). Refer to the Fish Habitat, Karst and Caves, Soil and Water, Wetlands, and Transportation sections in this report for a discussion of harvests as related to standards and guidelines for those resources.

Monitoring Results

There were 3,672 acres fully or partially harvested during fiscal year 1999 (3,609 acres which resulted in the creation of a opening). The majority of the harvests accomplished were sold under the 1979 TLMP. The 100-acre size limitation applies to all harvest units. No created openings exceeded 100 acres in size.

No units fell within the 1,000-foot estuary zone. There were 17 stands harvested during 1999 that fell partially or completely within the 1,000-foot beach zone. All of these harvests were from Category 1 or 2 sales that did not need to be modified as a result of the 1997 TLMP Revision and its 1,000-foot beach and estuary standard and guideline. The stands that fell within the buffer were located on three ranger districts.

Table 28. Category 1 and 2 Units Partially or Completely Within the Beach/Estuary Buffer

| District | Compartment | Stand | Unit | Unit Acres | Acres in Buffer |
|-------------------------|-------------|---------|------------|------------|-----------------|
| Petersburg | 39900 | 56 | 19 | 7 | 7 |
| | 39900 | 57 | 19 | 10 | 2 |
| | 39900 | 58 | 19 | 9 | 5 |
| | 39900 | 59 | 19 | 10 | 6 |
| | 39900 | 60 | 19 | 12 | 5 |
| Petersburg Total | | | | 48 | 25 |
| Sitka | 29300 | 235 | 150b & 151 | 38 | 0.1 |
| Ketchikan | 73301 | 64 | HSK3019 | 45 | 13 |
| | 73301 | 65 | HSK3025 | 50 | 7 |
| | 73501 | 43 | HSK5032H | 54 | 20 |
| | 73501 | 44 | HSK5034H | 24 | 13 |
| | 73601&73702 | 53 & 70 | HSK7009H | 44 | 27 |
| | 73602 | 78 | BC6025 | 29 | 1 |
| | 73602 | 79 | BC6027 | 31 | 21 |
| | 73701 | 134 | CLO003 | 10 | .3 |
| | 73702 | 103 | HSK7042 | 35 | 19 |
| | 73801 | 69 | BC8063 | 47 | 1 |
| Ketchikan Total | | | | 369 | 122 |

The 1,000-foot buffer applied to 12 stands during FY 1999. None of these fell within the 1,000-foot zones. All other harvest was outside the 1,000-foot beach and estuarine buffer zones.

Evaluation of Results

No action is needed. The timber harvest activities discussed above are adhering to applicable timber management standards and guidelines.

Timber Monitoring Question 2: Are harvested forested lands restocked within five years following harvest?

Forest productivity is to be maintained in all harvest areas. Areas not adequately restocked with desirable tree cover within a five-year time frame are to be identified and action taken to see that failed areas are reforested. Changes in silviculture practices may be necessary in these areas.

Obtaining regeneration that meets the stocking guidelines and certification standards identified in the Silvicultural Practices Handbook (FSH 2409.17) is rarely a problem on stands receiving a regeneration harvest on the Tongass National Forest. Unpublished research and field observations indicate there are specific site conditions and opportunities that may indicate a need for artificial regeneration (this is usually planting and only rarely artificial seeding). Some situations to be particularly aware of are as follows:

- Alluvial Sites
- Cutover, open canopy, or sparsely stocked sites with an established ground cover of dense vegetation such as salmonberry, devils club, or grass.
- Sites lacking a satisfactory seed source within approximately 660 feet from the center of the cutting unit.
- Sites with lower productivity which presently have a plurality of cedar and there is a desire to retain a cedar component in the stand.
- Stand compositions where there is a need for change, such as: stands planned for harvest or already harvested where the adjacent seed source contains a high incidence of fluted hemlock.
- Artificial regeneration is rarely needed and is prescribed on less than 5 percent of the harvested acres.
- Stands needing reforestation for other considerations such as: visually sensitive areas in which immediate regeneration through artificial reforestation would lessen the visual impact; or using genetically improved stock to increase the genetic makeup of the treated stand.

All harvested lands are examined following treatment. Artificially seeded or planted areas are examined one and three years after treatment. Examination occurs three years after treatment in areas where it is anticipated that natural regeneration will be adequate. Stands are certified as stocked, if the third-year survey indicates that the areas meet stocking standards. Artificial regeneration is prescribed if the third-year survey indicates that natural regeneration is highly unlikely. A silviculturist certifies that every unit harvested meets or exceeds the stocking guidelines in the Silvicultural Practices Handbook - FSH 2409.17. Records of certification are kept in stand files at the ranger districts and in the Silvicultural Information System (SIS), an electronic database.

During fiscal year 1999, 9,055 acres were examined to determine the condition of the regeneration in harvest areas. Timber harvest that occurred in fiscal years 1991 through 1994 will be evaluated.

Monitoring Results

Table 29. Status of Reforestation after Final Harvest FY 1991

| Tongass Unit | Final Harvest Reported in FY 1991 | Adequately Stocked Acres | % Adequately Stocked Acres | Acres Not Adequately Stocked | % Not Adequately Stocked |
|---------------------|--|---|---|---|---|
| Petersburg RD | 1,360 | 1,360 | 100 | 0 | 0 |
| Wrangell RD | 751 | 751 | 100 | 0 | 0 |
| Sitka RD | 562 | 562 | 100 | 0 | 0 |
| Hoonah RD | 1,435 | 1,378 | 96 | 57 | 4 |
| Juneau RD | 868 | 868 | 100 | 0 | 0 |
| Craig RD | 496 | 496 | 100 | 0 | 0 |
| Ketchikan/Misty RD | 360 | 360 | 100 | 0 | 0 |
| Thorne Bay RD | 4,568 | 4,568 | 100 | 0 | 0 |
| Total | 10,400 | 10,343 | 99 | 57 | 1 |

Table 30. Status of Reforestation after Final Harvest FY 1992

| Tongass Unit | Final Harvest Reported in FY 1992 | Adequately Stocked Acres | % Adequately Stocked Acres | Acres Not Adequately Stocked | % Not Adequately Stocked |
|---------------------|--|---|---|---|---|
| Petersburg RD | 1,767 | 1,767 | 100 | 0 | 0 |
| Wrangell RD | 1,034 | 964 | 93 | 70 | 7 |
| Sitka RD | 900 | 900 | 100 | 0 | 0 |
| Hoonah RD | 2,013 | 2,000 | 99 | 13 | 1 |
| Juneau RD | 406 | 406 | 100 | 0 | 0 |
| Yakutat RD | 450 | 450 | 100 | 0 | 0 |
| Craig RD | 281 | 281 | 100 | 0 | 0 |
| Ketchikan/Misty RD | 639 | 639 | 100 | 0 | 0 |
| Thorne Bay RD | 4,721 | 4,721 | 100 | 0 | 0 |
| Total | 12,211 | 12,128 | 99 | 83 | 1 |

Table 31. Status of Reforestation after Final Harvest FY 1993

| Tongass Unit | Final Harvest Reported in FY 1993 | Adequately Stocked Acres | % Adequately Stocked Acres | Acres Not Adequately Stocked | % Not Adequately Stocked |
|-------------------------|--|---|---|---|---|
| Petersburg RD | 1,880 | 1,880 | 100 | 0 | 0 |
| Wrangell RD | 936 | 936 | 100 | 0 | 0 |
| Sitka RD | 807 | 807 | 100 | 0 | 0 |
| Hoonah RD | 1,827 | 1,786 | 98 | 41 | 2 |
| Craig RD | 1,447 | 1,447 | 100 | 0 | 0 |
| Ketchikan/Misty RD | 414 | 414 | 100 | 0 | 0 |
| Thorne Bay RD | 3,807 | 3,807 | 100 | 0 | 0 |
| Tongass NF Total | 11,118 | 11,077 | 100 | 41 | 0 |

Table 32. Status of Reforestation after Final Harvest FY 1994

| Tongass Unit | Final Harvest Reported in FY 1994 | Adequately Stocked Acres | % Adequately Stocked Acres | Acres Not Adequately Stocked | % Not Adequately Stocked |
|-------------------------|--|---|---|---|---|
| Petersburg RD | 908 | 908 | 100 | 0 | 0 |
| Wrangell RD | 2,358 | 2,311 | 98 | 47 | 2 |
| Sitka RD | 1,285 | 1,285 | 100 | 0 | 0 |
| Hoonah RD | 890 | 856 | 96 | 34 | 4 |
| Craig RD | 420 | 420 | 100 | 0 | 0 |
| Ketchikan/Misty RD | 817 | 817 | 100 | 0 | 0 |
| Thorne Bay RD | 3,366 | 3,366 | 100 | 0 | 0 |
| Tongass NF Total | 10,044 | 9,963 | 99 | 81 | 1 |

1991 Harvests

Fifty-seven acres harvested during fiscal year 1991 remain uncertified. These acres are located on the Hoonah Ranger District in one stand. The following describes the status of the stand.

Compartment 21200 Stand 900: Stand 900 (57 acres) was examined for regeneration during July 1995. Based on that examination, Sitka spruce stock was ordered and the area was planted during the spring of 1997. Plantation survival transects and reforestation-stocking evaluations are scheduled for the year 2000. The plantation survival transect was examined in 1998, with 97 percent survival of planted seedlings. The stand is expected to be certified when examined in fiscal year 2000.

1992 Harvests

Eighty-three acres harvested during fiscal year 1992 remain uncertified. Thirteen acres are in one stand on the Hoonah Ranger District. The remaining 70 acres are located in one stand on the Wrangell Ranger District.

Compartment 21500 stand 6400: Stand 6400 comprises an area of 13 acres. It was planted in 1994 to Sitka spruce. Results of the first year plantation survival transect conducted in 1995 showed that long-tailed voles have clipped 45 percent of the spruce. Bole populations are volatile, and the area was replanted with Sitka spruce in 1997. The first-year plantation survival transect was completed in 1998, with 98 percent survival of planted seedlings. Plantation survival and reforestation stocking evaluations are scheduled in fiscal year 2000. Certification is expected after the survey.

Compartment 46700 stand 808: Stand 808 comprises an area of 70 acres. The stand was planted to Sitka spruce during 1997. A first-year plantation survival transect was conducted in 1998, with 92 percent survival. Reforestation stocking evaluations and a third-year survival transect are scheduled for 2000. The stand is expected to be certified when examined in fiscal year 2000.

1993 Harvests

Forty-one acres harvested during fiscal year 1993 remain uncertified. These acres are located on the Hoonah Ranger District in two stands. The following describes the status of these stands.

Compartment 20400, Stand 1134: Stand 1134 (32 acres) was planted to Sitka spruce during May 1994. Plantation survival transects and reforestation-stocking evaluations were scheduled for 1995 and 1997. The plantation survival transect was examined in 1995. Long-tailed voles had clipped off enough trees to require a replant (Sitka spruce), which was accomplished in 1997. A first-year plantation survival transect was conducted in 1998, with 99 percent survival. The stand is expected to be certified when examined in fiscal year 2000.

Compartment 20400, Stand 1136: Stand 1136 (9 acres) was planted to Sitka spruce during May 1994. Plantation survival transects and reforestation-stocking evaluations were scheduled for 1995 and 1997. The plantation survival transect was examined in 1995. Long-tailed voles had clipped off enough trees to require a replant (Sitka spruce), which was accomplished in 1997. A first-year plantation survival transect was conducted in 1998, with 96 percent survival. The stand is expected to be certified when examined in fiscal year 2000.

1994 Harvests

Eighty-one acres harvested during fiscal year 1994 remain uncertified. Thirty-four acres are in one stand on the Hoonah Ranger District. The remaining 47 acres are located in two stands on the Wrangell Ranger District.

Compartment 19300, Stand 170: Stand 170 comprises an area of 34 acres. It was planted in 1994 to Sitka spruce. A first-year plantation survival transect was conducted in 1998, with 100-percent survival. Plantation survival and reforestation stocking evaluations are scheduled in fiscal year 2000. The stand is expected to be certified when examined in fiscal year 2000.

Compartment 45902, Stand 800: Stand 800 comprises an area of 43 acres. A third-year examination for natural regeneration was conducted in 1998. Natural regeneration was below acceptable levels. The District Silviculturist felt that planting was unwarranted, and scheduled a natural regeneration examination for year 2000. The stand is expected to be certified when examined later this fiscal year.

Compartment 47700, Stand 250: Stand 250 is 4 acres in size, and is not certified. The area was planted to Sitka spruce in 1997. A first-year plantation survival transect was accomplished in 1998. It is expected that certification will occur later this fiscal year when the area is re-examined.

Evaluation of Results

The results show that an adequate percentage of the acres of harvested forest lands are restocked within five years following harvest. In all but one stand where regeneration was not naturally achieved, planting was implemented. Planting in the remaining stand was judged to be unnecessary and will be examined this year. Natural regeneration is anticipated to be of a quality and quantity to allow for certification. The planting is anticipated to meet stocking guidelines and certification standards within three years of planting.

Timber Management Question 3: Is the Allowable Sale Quantity (ASQ) consistent with resource information and programmed harvest?

The Tongass National Forest operated during fiscal years 1998 and 1999 under a TLMP FEIS Record of Decision (ROD) signed in May 1997, which set the allowable sale quantity (ASQ) at 2.67 billion board feet per decade. In April 1999, Under Secretary James Lyons signed a ROD that modified the Forest Plan and established the ASQ for timber harvest at 1.87 billion board feet per decade. Both the 1997 and 1999 Records of Decision provided transition time and language for plan implementation. The April 1999

ROD established October 1, 1999 as the date of implementation of the modified Forest Plan. (TLMP Record of Decision, April 1999, Section VII. Implementation, pgs. 63, 64).

The Tongass NF operated in fiscal year 1999 under the 2.67 billion board feet per decade ASQ ceiling. This is equivalent to an annual average of 267 million board feet during 1999. The ASQ is an upper decadal limit on the amount of timber that may be sold from suitable timberland on the Tongass National Forest as part of the regularly scheduled timber sale program. The measure of allowable sale quantity is based on "sold" timber sale volume over a decade. Annual amounts of "sold" timber volume may vary from year to year but the decadal ceiling must be maintained. The table below displays the amount of timber volume sold during fiscal years 1997 through 1999, and compares that total to the average annual amount of the ASQ.

Table 33: Tongass National Forest Timber Sold By Fiscal Year

| Fiscal Year | Timber Volume Sold (Million board feet) | Average Annual ASQ Quantity (Million board feet) (1997 TLMP ROD) |
|--------------------|--|---|
| 1997 | 111 * | 267 |
| 1998 | 24 | 267 |
| 1999 | 61 ** | 267 |
| 3-Year Average | 65 | 267 |

* Includes the last of the KPC Long Term Sale volume issued post settlement.

** This figure does not include timber sales that were advertised and had bid openings in fiscal year 1999 but were not awarded until fiscal year 2000. This "sold" timber sale volume will be attributed to fiscal year 2000, which is also when the Modified Forest Plan average annual sale quantity of 187 MMBF/year is effective.

As stated, the measure of the allowable sale quantity achieved is based on the timber volume sold per year, not the amount of timber volume advertised for sale or the quantity of timber volume harvested per year. Timber sales are typically sold during one year and are harvested over several years. Included in the table below are the harvest totals for the Tongass National Forest for fiscal year 1990 through 1999, for comparison purposes only.

Table 34: Tongass National Forest Timber Harvest By Fiscal Year

| Fiscal Year | Harvest Total (Million board feet) |
|------------------------------|---|
| 1990 | 471 |
| 1991 | 363 |
| 1992 | 370 |
| 1993 | 325 |
| 1994 | 276 |
| 1995 | 221 |
| 1996 | 120 |
| 1997 | 107 |
| 1998 | 112 |
| 1999 | 146 |
| 3-Year Average (1997 - 1999) | 122 |

The timber tables display that current timber harvest and timber "sold" levels are not at or near the 1997 and/or 1999 Forest Plan ASQ ceiling. The effects of timber harvest are below the amount analyzed in the 1997 TLMP FEIS and/or the 1997 and 1999 TLMP FEIS Records of Decision. Therefore, with the implementation of land use designations, standards and guidelines, and BMPs, the Allowable Sale Quantity is consistent with resource information and programmed harvest.

Personnel responsible for data gathering and monitoring of this question will meet in the spring of year 2001 to determine if data collection is proceeding according to plan, and if any corrections or improvements need to be implemented.

Evaluation of Results

No action necessary at this time.

Timber Management Question 4: Are the Non-interchangeable Components (NIC) of the allowable sale quantity consistent with actual harvest?

As stated in Question 3, the Tongass NF operated under the 1997 Forest Plan ROD, with an annual average ASQ of 267 MMBF, during fiscal year 1999. The transition language implements the Modified Forest Plan, effective October 1, 1999. The timber sale volume sold did not approach either the 267 MMBF ASQ from the 1997 Forest Plan or the revised 187 MMBF ASQ from the Modified 1999 Forest Plan.

The ASQ consists of two separate Non-Interchangeable Components (NIC). Under the 1999 Modified Forest Plan, NIC I is 1.53 billion board feet of timber per decade and NIC II is .34 billion board feet of timber per decade, or an annual average of 153 MMBF of NIC I and 34 MMBF of NIC II. The purpose of partitioning the ASQ into two components is to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground. The partitioning of the ASQ also serves to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions. The NIC I component includes land that can be harvested using normal logging systems. The NIC II component includes that land that has high logging costs due to isolation and difficult geography that is inaccessible and requires high logging costs to harvest.

Theoretically, the NIC II component of the ASQ (technically and economically marginal) would only be prepared for sale after the NIC I component of the ASQ level had been satisfied. Preparing and offering timber sales in the NIC II component would most likely occur when timber commodity markets were high and harvest costs could be covered by higher commodity prices. Realistically, this is not the case in Tongass timber sale offerings. Typically, the Forest prepares timber sales that have a combination of NIC I lands and NIC II lands included in the total timber sale package.

Timber sales implementing the modified Forest Plan standards and guidelines have been field prepared and sold but have not been harvested due to a 1998 market that reached a 30-year low, relatively soft 1999 market conditions, and the short duration of TLMP implementation. Due to the downturn in the Pacific Rim economies during 1998, 20 timber sales received no bids. These timber sales were re-offered in mid-April 1999, with 10 of the 20 sales receiving valid bids from qualified timber purchasers.

Monitoring Results

All timber sale harvest units that were completed during fiscal year 1999 were categorized into NIC components using the Forest geographic information system (GIS). The following are the results of that analysis.

Total timber volume harvested on the Tongass in fiscal year 1999 was approximately 146 MMBF. It is calculated that over 95 percent of this harvest was performed on projects approved prior to the Forest Plan ROD of 1997. As a result of this situation, insufficient data are available to answer this question. However, harvest information predating the April 1999 ROD can be used to formulate predictions of performance at present.

Table 35: 1999 Tongass Harvest Acres By Non-Interchangeable Components

| 1999 Total Tongass Harvest Acres * | NIC I Acres | NIC II Acres |
|------------------------------------|-------------|--------------|
| 3,672 | 3,217 | 455 |

* 95 percent of the 1999 harvest acres are from pre-1997 TLMP ROD approved projects.

Of the 3,672 acres harvested on the Tongass NF during fiscal year 1999, approximately 182 acres were harvested in post 1997 approved TLMP ROD projects. There were 455 acres of NIC II harvested of the total harvest acres. Timber harvest on NIC II lands accounted for approximately 12 percent of the total harvest. Conversely, NIC I lands accounted for approximately 88 percent (3,217 acres) of the harvest during fiscal year 1999.

The sample size of post TLMP ROD harvest acres make up a very small amount of the total harvest picture. However, if this trend continues, harvest from NIC I and NIC II lands will be consistent with the Forest Plan. The Tongass is offering timber sales that have both NIC I and NIC II components included, which is less economical than offering timber sales of just NIC I components.

As displayed in Timber Table 35, the timber volume sold has not exceeded the available volume to be offered in the NIC I category. At this point, it is predicted there will not be a problem with NIC I compliance. The Non-Interchangeable Component of the allowable sale quantity is consistent with actual harvest.

Evaluation of Results

No action necessary at this time.

Timber Management Question 5: Is the proportional mix of volume in NIC I and NIC II, as estimated in the Forest Plan, accurate?

The Forest Plan sets the proportional mix of volume in NIC I and NIC II at approximately 80/20 respectively. Harvest from NIC I is planned to comprise about 80 to 82 percent of the allowable sale quantity sold per decade. This represents a higher reliance on the harvest of NIC II lands than from the 1979 Forest Plan, in which about 93 percent of the harvest came from NIC I lands (normal operable). (Source: TLMP FEIS Part 1, Table 3-81, page 282)

The 1997 TLMP ROD directed the Forest Supervisor to review the accuracy of the planning information used to partition the ASQ between the two NICs during the first year of implementation (ROD pg 26). This review was completed in 1998, and documented in a report entitled The Tongass Plan Operability Analysis report. The Operability Analysis reviewed the proportional mix of volume in NIC I and NIC II. The 1998 Tongass Monitoring & Evaluation Report (p. 75-78) included a detailed discussion of this analysis.

Monitoring Results

As stated above, the 1998 Tongass Monitoring & Evaluation Report included the evaluation that was done comparing the operability inventory information used in the Forest Plan with a redetermination of operability from logging system transportation analysis (LSTA). A systematic process was followed to determine the accuracy of the operability information used for the Forest plan. The LSTA work was done in selected areas across the Forest that had in-depth field reconnaissance work verifying the logging plan. The process reworked the operability classifications, following the same procedures originally developed and used in a 1989 logging operability inventory.

The Forest-wide result was a slight decrease in normal operability, an increase in difficult operability, and a decrease in isolated operability. (Refer to Tongass Monitoring & Evaluation 1998 Report pages 75-78.) The overall change suggests that the NIC I component may have been overestimated by about 5 percent. The result was within the limitations of the data, and indicates that the operability information used in the Forest Plan was adequate for estimating the NIC I and II components of the ASQ.

The 1999 analysis was performed using the 1999 completed harvest unit data. Different results were found compared to that work performed in 1998. Although the operability classes were not used, the harvest units were compared by NIC I and NIC II classes. The NIC I and NIC II breakout for those acres

Both the 1999 Monitoring data and the 1998 Monitoring Report are within reasonable limits of the estimate. Further data is needed to analyze this monitoring question in more detail. Given the small sample size of the data used to make this indication, it appears the Forest Plan analysis was adequate for estimating the NIC components of the ASQ.

The April 1999 Record of Decision decreased the amount of land suitable for timber production Forest-wide from 676,000 acres to 576,000 acres – a 100,000-acre decrease (14.8 percent) from the Forest Plan EIS ROD signed in 1997. The result of this change was not analyzed in this monitoring question. The outcome of this change in suitable land may affect the accuracy of the proportional mix of volume in NIC I and NIC II land estimated in the Forest Plan.

Evaluation of Results

No action necessary at this time.

Timber Management Question 6: Should maximum size limits for harvested areas be continued?

The 1976 National Forest Management Act (NFMA) regulations established 100 acres as the maximum size for created openings (i.e., clearcutting) within the western-hemlock, Sitka spruce forest type of coastal Alaska. The Forest Supervisor, under certain conditions, can approve created openings of up to 150 acres. The Regional Forester can approve openings up to 200 acres. Factors to consider, when approving openings greater than 100 acres, are provided in the Forest Plan's Forest-wide Standards and Guidelines for the timber resource. There appears to be no need to pursue change in the maximum opening size or the factors for approving openings greater than 100 acres.

Monitoring Results

During the fiscal year, 138 different harvest areas (timber stands) were delineated in the Forest's geographic information system (GIS), with corresponding records created in the Forest's silviculture information database (SIS). Taking adjacency into account (harvested stands that touch one another, which create a larger opening when added together), 111 harvest areas were logged in 1999 that created openings. None of the openings created exceeded 100 acres in size. The openings averaged 33 acres, and ranged from 3 to 96 acres. The table below displays the frequency of harvest areas that fall within specified acre ranges.

Table: Harvest Unit Frequency by Unit Size

| Acreage Range | Number of Openings | Total Number of Acres |
|---------------|--------------------|-----------------------|
| 1-10 | 22 | 167 |
| 11-20 | 21 | 319 |
| 21-30 | 15 | 386 |
| 31-40 | 15 | 529 |
| 41-50 | 14 | 633 |
| 51-60 | 11 | 600 |
| 61-70 | 7 | 452 |
| 71-80 | 2 | 149 |
| 81-90 | 1 | 89 |
| 91-100 | 3 | 285 |
| Totals | 111 | 3,609 * |

* 3,672 acres if single tree selection harvests are included.

Evaluation of Results

Trends in harvest opening size have been toward smaller openings. Forest Plan Standards and Guidelines for scenery, sensitive species such as Northern goshawk and American marten, and soil and water Best Management Practices (BMPs) emphasize smaller sizes. Also, emphasis on leaving old-growth structure in clearcuts is resulting in breaking up the once large harvest size.

In addition to the 111 units displayed above, three units were harvested using single-tree selection (uneven-aged management system), totaling 63 acres. These three harvest units ranged in size from 10 acres to 34 acres. Single-tree selection units are not included in the above table because they created very small openings, usually one to three tree crown diameters in size.

Transportation

Goal: Develop and manage roads and utility systems to support resource management; recognize the potential for future development of major transportation and utility systems.

Objectives: Provide access for Forest users and support Forest resource management activities. Manage and maintain roads to protect water, soil, fish, and wildlife resources.

Transportation Question: Are the standards and guidelines used for forest development roads and log transfer facilities effective in limiting the environmental effects to anticipated levels?

Log Transfer Facilities

Monitoring will continue to be conducted for each log transfer facility (LTF) under terms of the LTF permits, in accordance with Alaska Water Quality Standards and requirements from the Environmental Protection Agency for Non-Point Source Discharge. LTF monitoring for this report was accomplished through field inspection and completion of a Log Transfer Facility Monitoring Table. This table is designed to pull together simple yes/no assessments made of the success of the BMPs stipulated as terms of the LTF permits. The assessment elements of the LTF Monitoring table include the following:

Table 37: LTF Assessment Factors

| Parameter | Details |
|---------------------|--|
| Site Identification | Common Name; Corps of Engineer Permit Name, NPDES 402 Permit |
| Transfer Activity | Facility Transfer Type; Activity Status; Current year volume |
| Fuel Control | Visible Oil Sheen per LTF guidelines M5 of TLMP (Alaska Timber Taskforce Guidelines); Discharge Reported to Alaska Department of Environmental Conservation (ADEC) under requirements of Alaska Administrative Code (18 AAC 75.300-307); Discharge Reported to National Response Center (NRC) under requirements of the Clean Water Act (40 CRF 110,117; and 302 |
| Runoff Control | Reference BMP 14.27 - Drain to Sediment Trap; Vegetated Filter Strip |
| Bark and Debris | Reference BMP 14.27 Excessive Churning Prevented; Remove Debris & Bark from LTF/yard; Bark & Debris Properly Disposed; Marine Bark Zone of Deposit; Date Last Dive |

Monitoring Results

Two general types of monitoring occur: upland and marine. The upland monitoring is summarized into simple yes/no assessments made by Forest Service timber sale administrators, and is recorded under the general categories of "Fuel Control," "Runoff Control," and "Bark and Debris." These assessments were made for all the active sites. Contracted divers performing underwater bark debris surveys accomplish marine monitoring.

Analysis

Site Identification: There are 61 LTF sites for which the Forest Service has authority and responsibility for some part of site management. The Forest Service does not hold all the permits for all of these sites, as some permits are in the name of timber sale operators.

Transfer Activity: Approximately 91 million board feet of timber were transferred over 14 LTFs identified as "active" in 1999. This is down slightly from 95 MMBF in 1998.

Fuel Control: Occurrences of visible oil sheens on the waters in the vicinity of 4 LTFs were recorded on 24 different dates in the Oil Sheen Daily Logs. All but one of the sheens was caused by either the barge during loading or, most commonly, equipment hydraulic system leaks during the barge loading process or

leakage onto log bundles that were subsequently placed in the water. The oil sheen monitoring alerted the operators to needed repairs that were made to the hydraulic systems.

One actual fuel spill occurred at Naukati, and was not related to log transfer activity. The spill involved about 140 gallons of fuel oil lost into the bay. A private barge tipped as the tide went out and one side grounded, dumping a recently filled 200-gallon tank over the side. The operator notified the USCG, contained the spill, and cleaned up the contaminants.

Runoff Control: The proper grading and control of runoff from the sites are integral elements of permit stipulations. This emphasis has led to the consistent and effective use of drainage control to settlement basins at 12 of the 14 active sites. One site that is not employing settlement basins is Portage Bay (Frederick Sound 18), which is located on a causeway. The sort yard at Portage Bay is graded to drain to vegetated filter areas as recommended in BMP 14.27. The other site not using settlement basins is Anita Bay 2 (Anita Bay North). This site transferred approximately 2 MMBF over a log crib bulkhead. There is no National Pollution Discharge Elimination System (NPDES) permit or stipulation applicable to this site, because the Army Corps of Engineers Section 404 permit was issued prior to 1985.

At one site, two sheens were recorded in the Daily Oil Sheen Log that were caused by road drainage water entering and surcharging the settlement basin. This subsequently washed entrapped oil into marine waters. Installing a ditch relief culvert to prevent road runoff from entering the LTF storm water collection system solved the problem.

Bark and Debris: This category considers bark and debris accumulations at both upland and marine areas associated with the LTF sites.

The goal of "prevent(ing) excess churning of overland flows of water and the generation of fine particulate materials in the yard" (BMP 14.27) was deemed to have been accomplished at all 14 of the active sites, a slight improvement over last year when 13 of 14 were successful. Achieving the goal required removal and haul of material to offsite locations from 7 of the sites. This practice was more widespread than last year, when bark and debris accumulations were removed from only 5 of the 14 active sites. At all sites where removal of material was required, this material was successfully relocated "in a manner that assures water quality protection" (BMP 14.27).

Marine bark deposition is a concern when evaluating whether Alaska Water Quality Standards are being met. The Department of Environmental Conservation (DEC) certifies that there will be a "reasonable assurance" that Alaska Water Quality Standards will be met if, among other factors, the zones of deposit for accumulation of bark on the ocean bottom meet certain criteria. DEC authorizes zones of deposit that "may include continuous coverage by bark and wood debris located on the ocean bottom that may not exceed both 1.0 acre and a thickness of 10 centimeters at any point." Underwater bark monitoring survey information taken under current permit requirements were evaluated in a manner consistent with this definition of the allowable zone of deposit.

Underwater bark debris survey results were available for 41 of the 61 identified sites. Dive surveys were accomplished at three previously unsurveyed sites in 1999, including Frosty Bay (Ernest Sound 18), which was identified in the 1998 monitoring as needing a survey to meet permit requirements from 1994 activity. TLMP Appendix G, Log Transfer Facility Guidelines, states that "monitoring and reporting guidelines are necessary to determine if a facility is meeting the permit stipulations." Of the 20 sites with no bark dive data, 14 are not required to conduct bark surveys because they were not required to obtain NPDES (Clean Water Act Section 402 permits) from the Environmental Protection Agency due to their "grandfather" status. The "grandfather" status applies to all sites for which an Army Corps of Engineers permit (Clean Water Act Section 404 permit) was issued on or before October 22, 1985. Of the six remaining sites with no bark dive data, three are barge sites that do not discharge bark to the water, and one has an expired permit that is not likely to be renewed.

Six sites with bark survey data showed the criteria of 1.0 acre continuous coverage thicker than 10 cm at any one point had been exceeded. Two sites with the largest zones of deposit (averaging greater than 10

acres) – Rowan Bay (Chatham Strait 60) and Hamilton Bay (Keku Strait 26) – are now equipped to allow barging of logs. A permanent bulkhead was installed at Rowan Bay in 1998 to proactively address the bark accumulation issue. The facility at Hamilton Bay is a pile-supported dock that has been used solely as a barge site for the past several years. The site with the third largest zone of deposit (4.6 acres) is Saginaw Bay (Frederick Sound 34), which is a log bulkhead with opportunity for barging at higher tides only. Three other sites with zones of deposit closer to the 1.0 acre standard (average size 1.1 acres) – Tonka Mountain (Wrangell Narrows 127), Lab Bay (Sumner Strait 54), and Corner Bay (Tenakee Inlet 25) – are shot-rock ramps. Some solution other than barging may need to be reached in the future at these sites, as the ramps are not easily modified to accommodate barging.

The TLMP Standards and Guidelines for LTF location recommend giving preference to locations along straits, and state that a site at the mouth of a bay is preferred over a site near the head of a bay. Such locations make use of currents strong enough to disperse sunken wood debris, and therefore minimize bark accumulation. This year, bark zone of deposit information is available at three sites taken in two consecutive years. This allows the monitoring of changes in bark accumulation in relation to transfer activity and site geography, and the evaluation of the effectiveness of LTF location standards and guidelines.

Table 38 displays bark zone of deposit changes between 1998 and 1999. Polk Inlet is located at the head of a bay with little tidal dispersion action. The site was active after the dive survey was conducted in 1998, and 0.1 acre of bark accumulated even though the site was inactive in 1999. Winter Harbor is located on a strait with good tidal dispersion action. The bark zone of deposit was reduced by 0.49 acres in the one year of inactivity. Southwest Neets accumulated 0.19 acre through activity in 1999. The site is located at the mouth of a bay where currents should be strong enough to reduce the zone of deposit when the site becomes inactive. Future bark surveys are required to substantiate this assumption.

Table 38: Bark Zone of Deposit changes.

| LTF Site | Volume 1998 | Volume 1999 | Zone of Deposit 1998 | Zone of Deposit 1999 |
|---------------|----------------|----------------|-------------------------|-------------------------|
| Polk Inlet | 29 MMBF | Inactive | .39 | .49 |
| SW Neets | 5 MMBF | 9 MMBF | .09 | .28 |
| Winter Harbor | 4 MMBF | Inactive | .91 | .42 |

Evaluation of Results

In 1999 all active log transfer facilities were operated in accordance with their permits. The cases where fuel/hydraulic fluid control was a problem were handled as anticipated in their operating plans. These actions, which are prescribed in the standards and guidelines for log transfer facilities, have been effective in limiting the environmental effects of LTF operation to anticipated levels. The guideline for locating LTF's along straits and channels proved to be effective in reducing underwater bark accumulations.

The Daily Oil Sheen Logs proved to be very useful in identifying causes of sheens and bringing about corrective actions. The logs are required by stipulation of NPDES permits in some cases and by Forest Service contract in others. Currently it is not a requirement at all active LTF sites.

Access and Travel Management

The TLMP Monitoring and Evaluation Guidebook (May 1999 draft) directs that gates and barriers on closed roads should be visually inspected for integrity and evidence of being bypassed. In 1999, information was collected on the existence and effectiveness of roadway features installed to block access to highway vehicles on all roads surveyed under the Region 10 Road Condition Survey Protocols.

The data presented below is not intended to represent conditions across the Tongass National Forest. It is simply a listing of the blockage features and their effectiveness found in the 1999 surveys. The data is not available for roads surveyed prior to this year. As the rest of the road system is surveyed over the next two years and the previous years of survey data are updated, a more complete picture of the effectiveness of road blockage features will be available.

Monitoring Results

Three types of blockage features were evaluated for effectiveness: trenches dug across the road with the material from the trench mounded in front of the trench; removed culverts; and removed bridges. Each of these features were identified and recorded, and visually checked for evidence of traffic driving past them. The data was recorded on both Forest development roads ("system roads") and non-system roads. System roads are under the jurisdiction of the Forest Service and are needed for the long-term management of the forest. Non-system roads are constructed under timber sale contracts as single-use short-term roads; such roads are intended to be closed to vehicular traffic and hydrologically stabilized after use, and returned to vegetative production within 10 years.

The blockage feature most often identified during the evaluation was the mound and trench. Effective mound and trench blockages were encountered 185 times on the Forest development road system and 60 times on non-system roads. Ineffective mound and trench blockages were found 67 times on forest development roads and 54 times on non-system roads. Sites from which culverts had been removed were effective at blocking traffic on all 25 forest development roads and 8 non-system roads for which data was recorded. Evidence of traffic beyond a pulled culvert was noted on only one non-system road. Removed bridges were recorded as effectively blocking traffic on 46 forest development roads; evidence of traffic beyond a pulled bridge was noted only twice.

Evaluation of Results

The monitoring results indicate that completely removing the drainage structures on a road is an effective method of blocking highway vehicle traffic, failing only 3 times out of the 82 applications of the method evaluated. The mound and trench technique was not nearly as successful. This technique allows the road to be reopened for forest management activities relatively easily, but also provides private users with the opportunity to fill in the trenches and reestablish use. This disadvantage can be minimized in the future by digging larger trenches, but more importantly, by developing public support for future access and travel management plans.

Stream Turbidity

Monitoring of stream turbidity was completed on the Wrangell Ranger District during fiscal year 1999. This monitoring provided information relative to water quality standards and responds to routine effectiveness monitoring commitments in the USDA Forest Service Memorandum of Agreement with the Alaska Department of Environmental Conservation (1992). Summary of this report is included in Soil and Water Question #4.

Wetlands

Goal: Minimize the destruction, loss, or degradation of wetlands, and preserve and enhance wetland functions and values.

Objectives: Avoid alteration of or new construction in wetlands whenever there is a practicable, environmentally preferred alternative. Implement Best Management Practices and estuary, riparian, and soil and water Standards and Guidelines specific to wetlands.

Background: Wetland implementation monitoring will follow established protocols for 100 percent BMP implementation monitoring. Additionally, a representative sample of harvest units and associated roads will be monitored annually using an interdisciplinary approach. Avoidance of wetlands will be monitored Tongass-wide each year, through GIS analysis.

Each Environmental Impact Statement completed for projects that contain wetlands includes evaluation and finding for impacts relative to wetlands. Studies exist that are aimed at partially answering functional effectiveness questions. Some of these studies are complete and some are on going. No one study can give us the answer to all the functional questions associated with management activities in wetlands.

Wetland Question 1: Are wetlands Standards and Guidelines being implemented?

The information provided in Table 39 was gathered from project implementation of Category 3 and 4 timber sales. (The 1997 TLMP ROD defined Category 3 projects as timber sale projects being planned but not having a ROD prior to the effective date of the TLMP ROD. Category 4 projects were those for which the NEPA planning process had not yet begun at the effective date of the TLMP ROD.) All roads built and units harvested in FY 1999 were initiated under the management direction of the 1979 TLMP, as amended. The activities that took place in 1999 were developed to achieve consistency with the revised Forest Plan.

Table 39. Total acres of wetlands harvested and miles of road constructed for the Tongass NF in FY 1999.

| Total Wetland Acres ¹ | Wetland Acres Harvested | Total % | Wetland Acres Impacted By Road Construction ² | |
|----------------------------------|-------------------------|---------|--|---------|
| | | | | Total % |
| 5,709,069 | 111 | .002% | 12.25 | .0002% |

1. Total acres of mapped land (excluding private lands and some wilderness areas). Data was taken from Tongass CLU (Common Land Unit) GIS layer, second growth and roads database.

2. Based on an average of 40-foot wide road.

Monitoring Results

Roads impacted a total of approximately 12 acres of wetlands. Of the total wetlands on the Forest (mapped wetlands, which exclude some wilderness areas and private lands), this accounts for less than 1 percent of the total wetlands.

Total wetlands impacted by timber harvest were approximately 111 acres. Timber harvest occurred in the Cloudy Timber sale on the Ketchikan/Misty Ranger District near Ketchikan. Of the total wetlands on the Forest (excluding some wilderness and private lands), this accounts for less than 1 percent of the total wetlands. Forested wetlands were mostly impacted by timber harvest.

With less than 1 percent of the total wetlands impacted by road construction and timber harvest, the Tongass NF has fulfilled the intent of the Standards and Guidelines during the year 1999 in avoiding wetlands where practicable. Even with the combined effects of FY 1998 and FY 1999 activities on wetlands, the Forest is illustrating avoidance of wetlands in its management activities.

BMP Implementation Monitoring

The Best Management Practices (BMPs) described in the Soil and Water Conservation Handbook (Forest Service Handbook 2509.22, October 1996) define practices that protect soil and water resources. The wetland Standards and Guidelines define site-specific measures to protect the resources. These Standards and Guidelines were monitored following a methodology described in the Tongass Monitoring Strategy. The Strategy was developed to provide direction for Tongass Land Management Plan Implementation monitoring.

The 1999 BMP Monitoring Report (see Appendix) contains details on how the monitoring was conducted. A summary of the findings for wetland resources is given below.

The BMP implementation monitoring included two distinct efforts: (1) 100 percent monitoring of the units closed out and roads finalized, and (2) Interdisciplinary Team (IDT) monitoring. The 100 percent monitoring was conducted primarily by Forest Service sale administrators and engineering representatives, with assistance from resource specialists in a few circumstances. The IDT Monitoring was conducted by a team of representatives from the Forest Service and other Federal and State agencies, which included sale administrators, engineers, foresters, planners, and resource specialists from soils, water and fisheries. IDT monitoring was conducted on a stratified random sample made up of more than 10 percent of units and roads monitored during the 100 percent monitoring effort

Monitoring Results

BMPs applicable to wetlands management

- BMP 12.5 – Wetland Protection Measures

Table 40. BMPs Implemented.

| BMPs Applied | Number of Times the BMP was Appropriate for Use | Number of Departures from BMP Implementation | Number of Times Corrective Action Did Not Bring Action into Full Compliance with BMP |
|---------------------|--|---|---|
| 12.5 | 44 | 0 | 0 |

Results of the 100-percent monitoring of units and roads for BMP 12.5 in 1999 concluded that the BMP was fully implemented at all sites (see Table 40).

Evaluation of Results

Existing Standards and Guidelines for wetlands need no adjustment at this time. This monitoring question is covered in its entirety in the annual BMP monitoring report. In this report, BMP implementation monitoring is also discussed in Soil and Water question 1 and 3 as well as in Fish Habitat question 2. We recommend combining the implementation monitoring into one question.

Wetland question 2: Are wetland Standards and Guidelines effective in minimizing the impacts to wetlands and their associated functions and values?

During FY99, a team of watershed specialists (soil scientists, ecologists, hydrologists and botanists) met to discuss issues surrounding wetlands in terms of the TLMP monitoring questions. Most specifically, the question of whether Forest-wide Standards and Guidelines are effective in maintaining wetland functions and values was discussed in a meeting in March 1999 and again in a field trip in August 1999.

Work on two specific studies, the Wet-Soil study and Road Interception of Groundwater study was completed that will contribute significant information toward developing wetland effectiveness monitoring protocols. The Wet-Soil study data illustrates some of the hydrologic functions of wetlands. The Road Interception of Groundwater Study data will assist to address the relationship between road construction and hydrologic flow. This study will contribute information about whether construction is attenuating wetland effectiveness.

Monitoring Results

Watershed Specialists Recommendations

The team of watershed specialists came up with the following thoughts and recommendations for addressing this monitoring question:

- Wetlands on the Tongass National Forest need to be classified using a hierarchical framework, which will crosswalk with US Fish and Wildlife Service classification and common land unit (CLU) wetland habitat classification.
- Field sampling for the wetland classification will need to be conducted in some wetland types where data gaps exist in our existing vegetation data set.
- Effectiveness monitoring will concentrate on those wetland types most commonly impacted by roads, which, according to GIS road and unit inventory data, are forested wetlands. As more funds and personnel become available, additional effectiveness monitoring will occur on other wetland types where management activities are commonly taking place. These include forested wetlands/emergent wetland complexes.
- Use Wet-Soil data gathered by Forestry Sciences Laboratory for functional information on some wetland types. Expand this study to include several more sites across the Tongass. Site selection will be discussed during winter/spring of FY2000. Site selection will occur during the field season of the same year.
- Use McGee's study protocols (Oregon State University Master's Thesis) for road interception of groundwater at several new sites that are wetlands, starting with a forested wetland site as top priority. Site selections will be discussed during winter/spring of FY2000. Site selection will occur during the field season of the same year.
- A study plan will be developed describing the proposed study sites and costs associated with implementing them. The proposed wetland classification will not take place until FY 2001 when working on the Regional Existing Vegetation Classification will be a priority, if funded, of the Alaska Region Ecology group. Proposed funding will be determined during FY 2000.
- Wetland values are best addressed at the project level. Values are subjective and will be determined during project planning. Monitoring the effectiveness Standards and Guidelines on wetland values will not be addressed in a Tongass-wide protocol, but will be determined on a project-by-project basis.

Results of the Wet-Soil Study and Road Interception of Groundwater

Summary of the Wet-Soil Study (a study aimed at looking at hydrologic functions)

The Southeast Alaska wet-soil monitoring program was established to investigate the saturation and reduction characteristics of several important soil types on the Tongass National Forest. This study was not specifically designed to answer the wetland effectiveness-monitoring question. However, it may provide some data illustrating certain wetland hydrologic functions for different wetland types being investigated. Water table characteristics for the soil series investigated were inferred from soil morphology, but the actual levels of saturation and reduction have not been confirmed with measurements.

Three transects of soils along drainage catenas were established that represented typical soil relationships along forested hill slopes. One significant area of consideration identified along drainage catenas is the transition zone between the well-drained mineral soils and the saturated organic soils. Transition zones are dynamic areas of groundwater discharge that result in changes in vegetation communities. Identifying the soils in these transition zones and understanding their saturation and reduction characteristics has been difficult due to the lack of measurements of soil water tables and associated biogeochemical reduction.

The Wadleigh soil (Loamy-skeletal, mixed, shallow Typic Cryaquod), the Mitkof soil (Loamy-skeletal, mixed, Typic Humicryod), and the Kina soil (Dysic, Typic Cryohemist) are all found at the transitional zones between the well-drained sideslopes and the poorly drained benches of the catenas. The Wadleigh and Mitkof soils are found in transitional areas between the well-drained Karta and Kupreanof soils and the poorly drained organic soils of the Kina-Maybeso complexes.

Four soils along each drainage sequence were described and classified. Piezometers, thermistors, and platinum electrodes to measure redox potential were placed at two depths within the soil that indicated periods of saturation and potential reduction. Platinum electrodes measure redox potential and pressure transducers measure water levels in piezometers to determine the saturation and reduction cycles in the soils. Pressure transducers and redox electrodes were connected to data loggers for data collection. Manual measurements were also taken to check the automated sensor accuracy at intervals over the monitoring period.

Preliminary data for the saturation and reduction in the soils located at slope transitions show that only the Wadleigh type soil at Thorne Bay shows sustained near-surface saturation and associated reduction. The other sites have saturated conditions below 30 cm, in most cases with varying levels of reduction.

Summary of Road Interception of Groundwater Study

This study is ongoing. Data is being analyzed this year. Some preliminary findings are presented below. The sites being analyzed are not classified as wetlands. However, one of the sites is borderline wetland. Soils at this site are Placic Cryaquods (Wadleigh variant).

Subsurface well water analysis reveals a relationship between low water levels and pre-API (antecedent conditions), as well as peak water levels with peak API conditions. These relationships were used to test differences in the wells above and below the road. It appears that there are similar slopes when comparing the wells above the road to the wells below the road for Peak water levels/Peak API, and Low water Levels/Pre-API. There may be evidence in different reactions in the above road verses below road wells in the peak water conditions prior to the road construction. A lack of storm data makes it difficult to conclude anything as yet.

In two seasons of data collection, the peak water levels in Transect A were to within 0.1 m of the surface, and in Transect B, 0.2 m of the surface. Through analysis it has been found that some of the wells that had high water tables were rising to a point but not necessarily draining, possibly holding an incorrect water level due to direct precipitation input and slow or no drainage.

Surface water results are showing that on the average the road ditch is flowing 112 percent of its estimated runoff (from an area volume estimate). The amount of ditch flow to stream flow is roughly 4 percent. It appears that the area draining to the ditch is roughly 4 percent of the area that is draining to the stream. There appears to be some type of a relationship between precipitation and ditch flow. However, there is variability between storm events and therefore variability in the ratio of estimated to actual runoff.

Final results of this study will be available sometime in fiscal year 2000. This study is not specifically designed for monitoring wetlands for the TLMP revision. Rather it is a Master's thesis conducted through the Forestry Sciences Laboratory and the Oregon State University, Corvallis. The study may help us understand some of the relationships between road construction and hydrologic flow; thus we hope to use this study as a template to design future sites in wetlands. We anticipate the information from this study will help answer the questions of whether our road construction techniques and the Standards and Guidelines we use are effectively maintaining the hydrologic function of wetlands that are being impacted by road construction. This study will be used in future sites, which will be selected this fiscal year (FY2000).

Evaluation of Results

The evaluation of the effectiveness of our Standards and Guidelines on wetland functions and values is still in progress. This analysis is will be based on two independent studies in progress and by developing additional study sites in wetlands commonly impacted by management activities. Ultimately, the understanding of wetlands will come from developing a common language, or classification, of wetland types across the Tongass National Forest. The effectiveness question will not be adequately addressed until a revised wetland classification is developed. At this time, adjusting the wetland Standards and Guidelines is not necessary.



WILD AND SCENIC RIVERS

Goal: Maintain the outstandingly remarkable values and the free-flowing conditions of rivers designated or recommended for designation as components of the National Wild and Scenic Rivers System.

Objectives: Manage all rivers recommended for designation as Wild, Scenic, or Recreational rivers in the Tongass Land and Resource Management Plan to maintain their eligibility pending designation by Congress into the National Wild and Scenic Rivers System.

Background: The Wild and Scenic Rivers Act of 1968 established a policy for preserving selected rivers in a free-flowing condition that would balance the development of water, power and other resources on rivers of the United States. Rivers are eligible to be considered for inclusion in the National Wild and Scenic Rivers System if they are essentially free flowing (without major dams diversions, or channel modifications) and if they possess at least one "outstandingly remarkable" scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value. These values should be a unique or exceptional representation for the area.

Wild and Scenic River Question 1: Are Wild, Scenic, and Recreational River standards and guidelines being implemented?

All rivers recommended for designation in the Forest Plan Record of Decision (April, 1999) are managed to protect the individually identified values that make each of these rivers eligible. All timber sale activities are designed to maintain eligibility for specific classification levels identified in the Forest Plan. Tongass-wide, monitoring was generally limited to the review of environmental analyses of projects that may potentially affect eligible rivers. However, three rivers were more intensively monitored to assure that standards and guidelines in the Forest Plan were implemented and effective: the Chickamin River on Ketchikan/Misty Ranger District; the Blind River on the Petersburg Ranger District; and Kadashan River on the Sitka Ranger District.

Chickamin River – Ketchikan/Misty Ranger District

Twenty-four miles of the Chickamin River are recommended for Wild designation, and two miles are recommended as Scenic. This river system is vast, and is the longest (26 miles) in the Tongass National Forest. It is currently one of only a few rivers on the Tongass National Forest used for river rafting. This river is located within Misty Fiords National Monument Wilderness.

Existing use in the Chickamin River drainage is within the range allowed in standards and guidelines, and these standards and guidelines are being implemented.

The wilderness monitoring crew traversed many of the drainages within each VCU of Misty Fiords National Monument and Wilderness, surveying for recreational sites and encounters as well as wildlife. Specific monitoring in the units that contain the Chickamin River and tributaries are described below. Encounters were documented on a daily basis and noted with their corresponding ROS classification; any visual surveys were completed on an as-encountered basis.

Monitoring Results

Following is a list of the data and observations relative to implementation of the Standards and Guidelines collected on the Chickamin River:

- Evidence of mining has been observed in one valley in the area. Marten trapping occurred up the Leduc drainage, which is a tributary drainage to the Chickamin.
- Social impacts are moderate within these areas, and are appropriate for the Primitive ROS classification. Flight seeing occurs within the Chickamin drainage, and the impacts should be noted with respect to air traffic.
- Freshwater landings on Leduc Lakes are occurring.

Evaluation of Results

- The mining activities and wildlife trapping are consistent with the management of the area and with standards and guidelines.
- Social encounters along this river are consistent with the setting and the standards and guidelines.
- The amount of use by airplanes at Leduc Lakes falls within the acceptable levels outlined in the standards and guidelines.

At present, the Chickamin River is generally considered to be in pristine condition and the Standards and Guidelines are being implemented. The river was traversed up the Leduc drainage and then on up to Leduc Lake. The remainder of the drainage remains largely unsurveyed.

Blind River – Petersburg Ranger District

Five miles of the river were recommended for Recreational designation. The Blind River is a highly popular recreation area accessible from Petersburg by road, and one of the few road-accessible rivers on the Tongass. Recreation developments include trails, picnic sites, and a wildlife viewing shelter. The river corridor also contains a fish hatchery that has provided an enhanced king salmon fishery.

The Recreational River standards and guidelines are being implemented for Blind River, and the free-flowing condition and outstandingly remarkable values for the river are being maintained.

Monitoring activities in 1999 to support the findings include:

- Monitoring visitor use at several recreation sites within the corridor;
- Monitoring outfitter/guide use in the area;
- Monitoring the compliance of trail projects within the corridor (Blind River Rapids and Swan Observatory); and
- Analyzing effects of proposed timber harvest in Woodpecker project area on outstandingly remarkable values and Recreational Rivers' standards and guidelines.

Monitoring Results

Recreation staff recorded the number of vehicles parked at the Blind River Rapids parking lot, Blind Slough Picnic Area, and Man-made Hole each time the site was visited. Over 20 cars parked at Blind Slough Picnic Area were noted on ten occasions. At Blind River Rapids most of the time there were less than 20 cars. On one occasion, the parking lot was completely full with 30 vehicles. Both sites can have high use during times of good weather and strong fish runs.

The whole river corridor is inventoried as Roaded Natural in the Recreation Opportunity Spectrum classification. The guidelines for social encounters in this type of area include meeting less than 20 other parties per day on trails and in dispersed areas during at least 80 percent of the primary use season. This condition is being met at Blind River Rapids trail area. Blind Slough Picnic Area is considered a developed recreation site where it is acceptable to meet numerous other parties. The guidelines also state that developed sites are often at full capacity but do not exceed 80 percent of the design capacity over the season of operation. This condition is being met at Blind Slough Picnic Area.

One outfitter/guide is currently permitted to take sightseers to Blind River Rapids trail and other sites along the road system on Mitkof Island. She visited Blind River Rapids trail approximately 70 times in 1999 with groups of 6 to 12 people. One day in June, she was a guide for a bus group and twice led a group of 16 to 20 people down the trail. Her permit allows her to guide up to 20 people on the trail at one time. In 1999, another person was permitted to operate a small concession stand at Blind River Rapids parking lot and Blind Slough Picnic Area. Both of these uses are compatible with standards and guidelines for Recreational River.

NEPA planning for two proposed trail projects on Blind River documents compliance with the Recreational River standards and guidelines. Plans to upgrade the recreation area at Man-made Hole are in progress. Man-made Hole is on the border of the river corridor recommended in the Forest Plan. Project planners intend to comply with the standards and guidelines for Recreational River, and to document compliance in the NEPA analysis.

The effects of proposed timber harvest in the Woodpecker project area were found to be compatible with the Recreational River standards for Blind River. The analysis is documented in the Recreation Resource Report for the project. The Draft Environmental Impact Statement is planned for release in early 2000. No units are proposed in the foreground distance from the corridor. Only two or three small units proposed in the middle ground distance (¼ mile to 5 miles) might be detectable from the extreme southern end of the river corridor; the largest is 13 acres. These units would not dominate the view, and may not even be noticed by the casual observer.

Evaluation of Results

While vehicle numbers at the recreation sites on Blind River were high at times, the areas away from established recreation sites had very few visitors. It is difficult to estimate the dispersed users who recreate along Blind River. Visitor levels from local use and outfitter/guide use fit the guidelines for Roaded Natural, which is the ROS class for the whole river corridor. These effects would be consistent with a Recreation River designation.

One monitoring project planned for the future is an airborne video flight of Blind River. This low-altitude flight would take video and digital still photos of the whole river corridor, and would provide a baseline tool to use in future years to compare any physical changes taking place in the corridor.

Kadashan River – Sitka Ranger District

Eight miles of the Kadashan River are recommended for Scenic designation. Kadashan River is typical of the streams of Chichagof Island, and its fish and wildlife values make it a popular subsistence and recreation area locally.

Monitoring Results

Sitka Ranger District focused on the lower half of the river corridor to monitor changes and uses of the area. The area is very important for fisheries, wildlife, and research and monitoring. According to a 1992 internal report, Kadashan drainage is one of the largest producers of anadromous fish in northern Southeast Alaska. There are three cabins under special use permit or administrative use located within the river corridor. The Forest Science Lab (FSL) maintains one cabin, which is used to house FSL employees performing small mammal and fisheries research in Kadashan valley.

Two cabins are under special use permit to Alaska Department of Fish and Game (ADF&G) for fisheries and wildlife projects. ADF&G has several trails (brushed walkways) for accessing the river and stream sampling points. In 1993, one portion of a trail near the riverbank had become muddy and was eroding into the river. ADF&G then stopped using the trail; subsequent monitoring has shown it to be re-vegetating and no longer muddy.

The United States Geologic Survey (USGS) has a gauging station on the river and on a tributary. The station on the river consists of a small building, painted to blend with the natural surroundings. Associated with the gauging station is an old cabin, which has completely collapsed. The station on the tributary consists of a flume for channeling the stream and a small (3-foot by 3-foot) box containing the data collection equipment.

The Forest Service performed watershed research in the Kadashan valley during the 1980's to evaluate sedimentation. A cabin was maintained in a muskeg above the river to house personnel working on the

project. This cabin was burned and the associated metal removed in 1997. The vegetation was charred, but continues to grow over the cabin site.

The ROS classification for the river corridor is Semi-primitive Motorized and Semi-primitive Non-motorized, which allows for encounters with less than 10 parties per day. The outfitter/guides with permits in this area are directed to keep their party size to 12 or less. According to 1998 use reports, encounters with less than 10 parties per day have been maintained. Tour operators reported 233 service days of use for 1998 on Kadashan River: 1 day for brown bear hunting, 50 days for fishing, and 182 days for hiking.

Evaluation of Results

The ADF&G and FSL cabins continue to be used and are rustic in appearance. They are consistent with the Semi-primitive character of the area. The FSL fish wheel needs to be removed if it is no longer used. The USGS cabin that has been dismantled needs to be removed from the site. The Forest Service tent platform has been dismantled and burned. The site has begun to recover.

Standards and guidelines are being implemented, and used to direct management decisions. Eligibility of specific classifications levels recommended in the Forest Plan is being maintained until Congress makes these designations.

Wild and Scenic River Question 2: Are Wild, Scenic, and Recreational River standards effective in maintaining or enhancing the free-flowing conditions and outstandingly remarkable values at the classification level for which the river was found suitable for designation as part of the national Wild and Scenic River System?

Eligible rivers recommended for Wild and Scenic River designation on the Tongass National Forest are currently being managed to protect their highest level of eligibility until Congressional designation occurs. Application of Forest-wide standards and guidelines that form Wild and Scenic River management prescriptions assures that no activities are allowed that may compromise the outstandingly remarkable values that made each of the recommended rivers eligible. The standards and guidelines have been effective in maintaining these values.

Management prescriptions applicable to Wild, Scenic, and Recreational Rivers include standards and guidelines for all associated resources such as: Air Quality; Beach and Estuary Fringe; Facilities; Fish; Forest Health; Heritage Resources; Karst and Cave Resources; Lands; Minerals and Geology; Recreation and Tourism; Riparian; Scenery; Soil and Water; Subsistence; Threatened, Endangered and Sensitive Species; Trails; Transportation; Wetlands; and Wildlife.

Monitoring and effectiveness of the standards and guidelines are described for each river below.

Chickamin River – Ketchikan/Misty Ranger District

Existing use in the Chickamin River drainage is within the range allowed in standards and guidelines, and these standards and guidelines appear effective in appropriate management of the river.

The wilderness monitoring crew traversed many of the drainages within each VCU of Misty Fiords National Monument and Wilderness, surveying for recreational sites and encounters as well as wildlife. Specific monitoring in the units that contain the Chickamin River and tributaries are described below. Encounters were documented on a daily basis and noted with their corresponding ROS classification; any visual surveys were completed on an as-encountered basis.

Monitoring Results

- Evidence of mining has been observed in one valley in the area. Marten trapping occurred up the Leduc drainage, which is a tributary drainage to the Chickamin.
- Aside from the historical use observed during the inventory, the only other physical impact observed was a cabin located approximately two miles upriver from saltwater on the right bank of the river. The cabin is only visible at close range, and the existing structure appears to be the framework for a canvas tent. A 50-gallon oil barrel, chimney pipe, and plastic are the only obtrusive remnants.
- Downed logs obstructing the main channel have been cut for safe passage up the mainstream of the Chickamin, and up the Leduc River beyond the entrance of the Leduc Lake drainage.
- Social impacts are moderate within these areas, and are appropriate for the Primitive ROS classification. Flight seeing occurs within the Chickamin drainage, and the impacts should be noted with respect to air traffic.
- Freshwater landings on Leduc Lakes are occurring.
- Fish habitat was inventoried. A base level inventory was initiated in the channel. Pink salmon and juvenile salmon were observed throughout the system.

Evaluation Results

- The mining activities and wildlife trapping are consistent with the management of the area and with standards and guidelines.
- The structure observed predates the area as wilderness. It is no longer in use and conforms to the rustic nature of the area.
- The clearing of logs from the stream is not consistent with the standards and guidelines of the recommended river designation or the wilderness designation.
- Social encounters along this river are consistent with the setting and the standards and guidelines.
- The amount of use by airplanes at Leduc Lakes falls within the acceptable levels outlined in the standards and guidelines.
- Fish habitat is supporting aquatic life. The baseline data will be useful in monitoring the effects and changes over time in the fish habitat.

Blind River – Petersburg Ranger District

The Recreational River standards are effective in maintaining and enhancing the free-flowing conditions and outstandingly remarkable values for Blind River.

The Petersburg Ranger District enhanced the recreation experience on Blind River in several ways in FY 1999, while staying within standards allowed for Recreation rivers:

- Constructed a loop trail off the existing Blind River Rapids trail to help disperse use and expand the recreation activities available in the area.
- Reconstructed the trail to the Swan Observatory to meet accessibility guidelines.
- Closed the boat ramp at Blind Slough picnic area during the summer months to alleviate the conflict between swimmers and motorized watercraft.

Monitoring Results

The outstandingly remarkable value of recreation on Blind River was enhanced in 1999 with two projects: construction of a fully accessible loop trail off the existing trail at Blind River Rapids, and reconstruction of a short trail to the Swan Observatory to make it fully accessible. Both of these projects are compatible with the standards and guidelines for Recreational River.

The boat ramp at Blind Slough Picnic Area was closed to trailer launching of boats and other watercraft, to prevent the conflict and safety hazard of swimmers and power boats using the same area at the same time. Hand launching of rowboats, canoes, and other non-motorized watercraft was still allowed. On September 1, 1999, the boat ramp was re-opened to allow access for people who use skiffs to fish for coho in that part of Blind Slough. By then, there are very few, if any, swimmers in the area. No negative comments were heard about the closure this summer.

One section of Blind River is closed to motorized vehicles from December 1 to April 1 each year. This closure protects the trumpeter swans that winter there. During the winter of 1998/1999, tracks showed that snowmobiles had illegally entered the closed area at least a couple of times. No machines were actually seen while in the closed area.

Evaluation of Results

Winter recreation activities on Blind River have not been monitored as closely as summer activities, because there is no regular maintenance program for the area in the winter. Most information is provided by Forest Service employees who recreate in the area. When weather conditions allow, ice-skating on Blind River is a very popular activity for Petersburg residents. Since good ice conditions do not last long for skating, the number of people using the Blind Slough Picnic Area can be quite high. For four days during December 1998, it was estimated that 150 people visited the site during the course of a day. Many people only stayed 2 to 3 hours, so the number of people at one time was less than that. In addition, many skaters dispersed away from the main picnic area for much of their stay.

Cross-country skiing and snowmobile use are also popular in the area when snow conditions allow. Since part of the area is closed to snowmobile use in the winter, there is a need to continue monitoring it for compliance.

This area is one of the few places in Southeast Alaska where trumpeter swans stay all winter, which contributes to the river corridor's high wildlife value.

Kadashan River – Sitka Ranger District

Monitoring Results

The ADF&G cabins and the FSL cabin are outside the standards and guidelines for a scenic river, since they are visible from the river. These structures were permitted before Kadashan was nominated for Scenic River designation. No new structures would be permitted.

Approximately 160 acres are privately owned at the head of Kadashan Bay. This land has not become available for purchase by the Forest Service.

Before the Tongass Timber Reform Act of 1990 (TTRA) was enacted, a road was constructed within Kadashan Valley. The original purpose of the road was to connect Corner Bay and False Island for transport of timber. TTRA designated the area as LUD II, and the road was never completed.

Evaluation Results

The Kadashan Scenic River corridor is contained within a congressionally designated LUD II area. This designation has protected the area and maintained the values that made it suitable for designation. With the nomination to a Scenic River in the Forest Plan Revision, the additional specific standards and guidelines relating to Wild and Scenic River management complement and refine LUD II standards and guidelines. No new projects have been planned for the area, except authorization of outfitter/guide permits. With the lack of new projects in the area, the effectiveness of the standards and guidelines has not been tested at this time.

Wilderness Areas

Goal: Manage designated wilderness to maintain an enduring wilderness resource while providing for public access and uses consistent with the Wilderness Act of 1964 and the Alaska National Interest Lands Conservation Act of 1980 (ANILCA).

Objectives: In wilderness, manage for the adopted ROS class. Where ROS has not been adopted, manage for no greater development than Semi-primitive (with certain localized exceptions due to the effects of activities outside wilderness and ANILCA exceptions).

Background: Congressionally designated Wilderness on the Tongass National Forest comes from two legislative acts. The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 established 14 Wildernesses totaling 5.5 million acres within the Tongass. Two of the areas, Admiralty Island and Misty Fiords, were also designated as National Monuments. Prior to ANILCA, there was no designated Wilderness on the Tongass. In 1990, the Tongass Timber Reform Act (TTRA) amended ANILCA and designated five new wildernesses and one addition to a wilderness, totaling 296,080 acres. This brings the total to 5.7 million acres in 19 wildernesses on the Tongass National Forest.

Wilderness Question 1: Are standards and guidelines for the management of wilderness being implemented?

Standards and guidelines for management of wilderness on the Tongass National Forest are implemented in conjunction with direction found in Forest Service Manual 2320. Specific projects, design narratives, and environmental analyses were reviewed for concurrence with standards and guidelines, and for protection of wilderness values at the Forest and ranger district levels. Physical monitoring of resources and conditions was accomplished primarily through field visits by managers and wilderness rangers, and varied by district. Specific information related to implementation of Wilderness standards and guidelines by ranger district are described below.

Admiralty National Monument

The Admiralty National Monument Wilderness Management Direction was completed in 1983, amended in 1985, and incorporated into the Forest Plan in 1997. Most standards and guidelines have been implemented and are consistent with the direction in ANILCA.

Lands: Three tent platforms were inspected. One platform that had been permitted and approved had not been built; the second and third platform areas had been cleaned adequately. A trespass cabin was discovered at Midway Point.

Three special use permit cabins were inspected. One cabin had been rebuilt, and its deck may be too large. Another cabin permit holder wants to relocate the cabin to a better site downhill and rebuild the structure. Follow-up with the permit holders for these cabins will be done in the fall, 1999. The third inspection indicated everything at the site was acceptable.

A site survey with the BLM of a Native allotment was done at Windfall Harbor. Remnants of an old structure were found, but it does not appear the structure is very old based on some of the materials used. A formal determination by the BLM will be completed.

A permit for monitoring the water flows in Thayer Creek was issued. This monitoring is the initial phase for developing Thayer Creek for hydro electrical purposes.

Twenty-two miles of boundary between Shee Atika lands and National Forest Lands were reviewed. The Hasselborg homestead in Mole Harbor was obtained as part of the Greens Creek Mine Land Exchange and the new boundaries were verified.

Heritage Resources: A Passport in Time (PIT) project, studying the whaling station history at Tyee, was completed. Half the project was devoted to library research in the Alaska State Library and the other half was spent at Tyee. While in the field, volunteers mapped foundations, equipment, and other artifacts. In addition, two native stone fish traps were discovered. A report was completed in the fall of 1999.

Cabin and Trail Maintenance: Fourteen cabins and twenty-eight miles of trail were maintained. The Admiralty Cove -Young Lake Trail had 450 feet reconstructed with puncheon. The trail was inventoried to determine additional work needed. Inventory results have been placed in a computerized log database.

A USFS public rental cabin at East Florence Lake was removed because of its poor condition and low use level. Three other cabins had major repairs completed (i.e., new foundations, walls, roofs). Forest Service crews and volunteers from the American Hiking Society and the Territorial Sportsmen maintained twelve cabins.

Nine of Admiralty's ten Civilian Conservation Corps shelters on the National Historic Register received normal annual maintenance. The tenth shelter had sill logs and uprights replaced, consistent with the historical construction. This work was accomplished through a partnership with the Discovery Foundation and Southeast Alaska Guidance Association.

Juneau Ranger District

Projects, design narratives, and environmental analyses were reviewed for concurrence with standards and guidelines and for protection of wilderness values at the Forest and District levels. Managers and wilderness rangers accomplished the majority of monitoring.

Monitoring Results

Juneau Ranger District conducted management and monitoring trips in Tracy Arm-Fords Terror Wilderness and the Chuck River Wildernesses via a ranger boat, by inflatable boat, and several wilderness ranger trips. Monitoring wilderness in 1999 for the Tracy Arm-Fords Terror and Chuck River Wilderness Areas was done for outfitter/guide campsites, non-commercial/non-guided campsites, and visitor use. Monitoring showed good overall compliance with permits and no major resource damage at most camp sites. Some heavy use with campsite impact was observed only at Fords Terror in Tracy Arm/Fords Terror Wilderness. Monitoring for the Endicott River Wilderness was limited to a fly-over by fixed wing aircraft in September of 1999.

A capacity analysis for the Tracy Arm-Fords Terror Wilderness was completed this year, based on information gained from monitoring. Whether or not new management strategies are needed to address commercial and non-commercial uses was assessed. In addition, an environmental assessment addressing crab pot storage was completed. Steps have been taken to insure removal of abandoned and illegal crab pots, and to follow Forest Plan standards and guidelines for the area.

Evaluation of Results

The following list identifies areas of concern where Wilderness standards and guidelines may not be completely met:

- Noise and visual impacts from motorized vessels on adjacent marine waters outside Forest Service jurisdiction.
- Air traffic noise and visual impacts outside Forest Service jurisdiction.
- Ground and vegetation compaction and disturbance caused by large commercial groups, campers, and commercial crab pot storage.
- Lack of funding to implement Wilderness Implementation Schedules (WISs).
- Gravel airstrips within the Wilderness.
- Lack of jurisdiction on marine waters.
- Displacement of wildlife due to noise from motor vessels.
- Development of private in-holdings within wildernesses.
- Illegal outfitting and guiding at high mountain lakes accessible by floatplanes and along the shoreline by boat-based operators.

Ketchikan/Misty Ranger District

In a few concentrated areas associated with the commercial flight path between Ketchikan, Rudyerd Bay and the Behm Canal, standards and guidelines are often out of compliance during the summer season. However, this area represents a fairly small portion of the whole of the Misty Fiords Wilderness. The remainder of the wilderness is presently being systematically inventoried and monitored utilizing a comprehensive ecosystem-monitoring program established in 1997. For the most part, remaining areas outside the core of the above flight path that have been inventoried have been consistent with standards and guidelines. Answering this question for the whole of the wilderness on this District will require many more years of inventory and monitoring work.

Monitoring Results

An ecosystem approach to monitoring conditions was accomplished for the Misty Fiords National Monument Wilderness. The interdisciplinary nature of the work relies on multiple resource specialists within the Forest Service to provide quality, useful, broad-scale, observational, baseline data. It is important to realize that an inventory/monitoring program is a collection of broad scaled observational data whose purpose is to identify consistencies and inconsistencies of a resource, to aid us in determining the need for a research project. Specific project monitoring narrows down the scope of an issue and provides statistically sound data to support or not support the initial observations.

There has been a continued effort to acquire private in-holdings through the acquisition system in Misty Fiords National Monument Wilderness (MFNMW). Not only do these acquisitions reduce Forest Service landline responsibilities but they also give the agency greater ability to manage activities that could negatively impact the wilderness resource.

Monument staff has tried to set the highest example for wilderness travel, camping, and working within the monument wilderness. Projects within the wilderness have been conducted using minimum tool standards. Trail and cabin maintenance, heritage resource monitoring and inventory, and fish pass maintenance activities have met the wilderness administrative standards. These groups opted to set a non-motorized/non-mechanized example.

Evaluation of Results

Areas that pose concerns for the Wilderness resource include:

- A privately owned floating dock in Rudyerd Bay: Discussions continue regarding a floating dock at the head of Rudyerd Bay. The volume of air traffic has risen in the past two years, creating conflict with other outfitter/guide operators. Impacts resulting from the associated use of air space and saltwater have affected wilderness values of the Misty Fiords National Monument Wilderness in the proximity of this dock.
- Monitoring of outfitter/guide operations in the field included monitoring one kayak tour company and three flight-seeing companies. Standards and guidelines addressing social encounters in wilderness are not being implemented in some locations. Remoteness and solitude values are often affected as the sights and sounds of aircraft are frequent in the primary flight paths. Conflicts between user groups are developing in spite of the informal zoning that has occurred. Changes in wildlife use patterns are also being noted as a result from a new fly/cruise tour that is being offered outside Forest Service jurisdiction (landing on saltwater). Most other special use permits comply with standards and guides.

Elements that need continued emphasis:

- Noise and visual impacts from motorized vessels on adjacent marine waters and air traffic increasingly affect wilderness values.
- Displacement or harassment of wildlife due to motorized activities.
- Development of private in holdings within wildernesses.
- Establishment of Limits of Acceptable Change (LAC).
- Continued monitoring of existing conditions.

Petersburg Ranger District

The standards and guidelines are being implemented for wilderness with a few exceptions. Standards and guidelines for Recreation and Tourism, Recreation Use Administration, Section E ("Maintain existing public use cabins at present or improved condition") are not being met for the Salt Chuck East cabin. Lack of sufficient funding has prevented heavy maintenance at the Salt Chuck East Cabin, where the front deck is rotten and in need of replacement. The Petersburg Lake cabin is in need of reconstruction and does not meet the standard, but the project was submitted this year for the Region 10 Capital Investment Program. Another shortfall is implementation of the standard and guideline for Threatened, Endangered, and Sensitive Species in the Petersburg Creek/Duncan Salt Chuck Wilderness, where inventories have not been done for TES plant species.

Summary of wilderness monitoring activities on the Petersburg Ranger District:

- Reviewed special use permits for compliance with wilderness standards and guidelines.
- Surveyed condition of two cabins and six miles of trail.
- Developed monitoring protocol for campsites, and did quantitative measurements on one campsite in wilderness. Attempts were made in the fall to survey two outfitter/guide camps, but poor weather conditions prevented the work from taking place.
- Wilderness rangers inventoried two campsites and visually monitored 22 campsites.
- Wilderness rangers visually surveyed 19 archeological sites in Tebenkof Bay for condition of the resource. Archeologists inspected 10 sites in Tebenkof Bay Wilderness and Kuiu Wilderness.
- Seven field days were spent with a Forest botanist on controlled meander surveys of plants to assist in determining TES species and nonnative species in the Tebenkof Bay and Kuiu wilderness areas. A database was created for use in monitoring wilderness flora.
- Wilderness rangers compiled information on over flights, public encounters, activities and number of boats.

Monitoring Results

- The cabin condition surveys revealed that the deck on the Salt Chuck East Cabin is rotten and in need of replacement. The deck will be used until it becomes a health and safety issue. At that time, the decision will be made to close the cabin or to repair the deck. The Petersburg Lake Cabin is in need of reconstruction/relocation and the project has been submitted for Capital Investment Program funding.
- The trail condition surveys revealed a significant amount of trees were blown down across the Affleck Portage Trail by the December 1998 windstorm.
- The plant-monitoring program in the Tebenkof Bay Wilderness revealed significant populations of Loose-flowered bluegrass (*Poa laxiflora*), which is listed on the Alaska Region Sensitive Species List. Six individual populations of Poa were found, including an inland riparian population of several hundred stems. Two other species found, which are uncommon to this area and of interest, were Oeder's lousewort (*Pedicularis oederi*) and Alpine meadowrue (*Thalictrum alpinum*).
- Wilderness ranger visual surveys found that the use at the mouth of Petersburg Creek may have exceeded the Semi-primitive Motorized encounter guideline of six parties on several occasions. This was a qualitative observation, since no standardized sampling was done to monitor this site. A complication at this site is that much of the use is in boats on short day trips from Petersburg, and many of the people do not go ashore.

Evaluation of Results

- Cabin condition surveys point out the need to bring the cabins up to standards.
- The trail surveys indicate the need to log out the Affleck Portage Trail. One half of the trail was reopened this year using traditional tools. It will take another five days of crew time to log out the remainder.
- The plant-monitoring program for the Tebenkof Bay and Kuiu wilderness areas should be continued to further evaluate the status of these remote wilderness areas. Plant monitoring will ensure that wilderness standards and guidelines are being met for Threatened, Endangered, and Sensitive Species, as well as establishing a baseline to monitor plant populations in the wilderness.
- The portal at Petersburg Creek should be monitored in year 2000 for use levels during high use periods (i.e., steelhead and coho fishing) to determine if standard and guideline encounter levels are being exceeded.

Sitka Ranger District

Emphasis for monitoring was placed on the West Chichagof–Yakobi Wilderness Area. A short visit to South Baranof Wilderness also occurred. Wilderness monitoring was performed in conjunction with ranger boat trips, or flights supporting other activities.

Monitoring Results

West Chichagof -Yakobi Wilderness Area

The area evaluated includes uplands in the vicinities of Piehle Passage, Slocum Arm, Hidden Cove, Island Cove (Cobol), Ford Arm, Klag Bay, Lake Anna, Sister Lake, Myriad Islands, Ogden Passage, Kimsham Cove, Black Bay, Lydonia Island, Didrickson Bay, Pinta Bay, Goulding Harbor, Baker Cove, Dry Pass, Mirror Harbor, Fleming Island, and White Sulphur Springs. These areas are situated on the west side of Chichagof Island, between Point Dougherty to the north, and Point Leo to the south.

Recreation and Tourism: Very little active use of the Wilderness was observed during the six-day ranger boat trip in April. Contact was made with one lone kayaker in Ogden Passage, and with one freshwater fishing party that was setting up camp in Ford Arm.

No activity on the part of outfitter/guides was observed. Permits and previous year use reports were reviewed prior to the trip for consistency with standards and guidelines. Permit terms and stipulations were found to be in accordance with operations within Wilderness, and no incidents were noted of reported group sizes exceeding 12 in number. Outfitter/guide use in the Wilderness is transitory in nature. Currently, use is day use only, and is generally restricted to the near shoreline area. At this time, only small operators are utilizing the Wilderness. None of the operators running the mid-size cruise ships operate there. There are no temporary outfitter/guide camps under permit.

Visits were made to 43 sites that had been inventoried as part of past monitoring efforts and in association with Limits to Acceptable Change. Five new campsites were identified, and added to the inventory. Few sites showed signs of recent use, although some show an increase in the amount of site hardening. A visit was made to a known problem site at Khaz Head, which is used seasonally by fishermen as a shore-based camp. The site had been used again in this manner. The site was restored, and a considerable amount of trash was removed.

The public use cabin at White Sulphur Springs was visited. The condition of the cabin was evaluated for determination of maintenance contract specifications, and the stovepipe was replaced. Although no current use of the area was observed, it is evident that the area of the cabin (and adjacent bathhouse) receives much use. There is extensive site hardening there, and at three nearby dispersed campsites.

Heritage: Visits were made to Cobol, and to the Sisters Lake Powerhouse. Both sites have historic value associated with past mining activity, and both sites continue to deteriorate. A small tree has fallen across the roof of the main house at Cobol, and the main building at the Sister Lake Powerhouse has collapsed. It is likely that the powerhouse collapsed under the past winter's heavy snow load.

Minerals: There are currently no minerals-related activities occurring within the Wilderness; however, visits were made to two sites of claims that are now null and void. One claimant in the Klag Bay area has been directed to remove improvements and property from that claim site. The site of a past claim on Fleming Island was checked to see how well the site was recovering from a restoration effort that occurred several years ago. Forest Service personnel had cleaned the site and capped the shaft, which had presented a danger to health and safety. The site where the old cabin was burned in place was found to be filling in with new, native vegetation. The cap on the shaft remains in place, and continues to serve as a protective barrier.

Lands: Visits were made to a permitted, isolated cabin in Klag Bay, and to a cabin in Lake Anna. Both cabins and associated improvements were found to comply with permit terms. Both sites appear to be well kept, and are free of trash.

In addition to the above noted Klag Bay site, several other trespass sites were visited. The first is a short trespass road near Kimsham Cove, which was pioneered several years ago by the individual leasing the patented claim owned by the City and Borough of Sitka. The individual was compelled to stop using the road, and efforts were made to re-vegetate the roadbed. The visit revealed that re-vegetation efforts were unsuccessful. With permission from the City, personnel went onto the property to check on the status of rusting fuel drums, which had the potential of contaminating the adjacent Wilderness. The check revealed that the fuel containers had been removed.

There are two non-permitted structures at Mirror Harbor. One appears to be an old smoke house. It is likely associated with past subsistence use in the area. The other is a small cabin, in poor shape, which appears to be utilized periodically by hunters. A large amount of trash was removed from this site.

Trails: Portions of four trails were hiked. There was too much snow on the Goulding Trail to hike much further than ¼ mile. The Didrickson Lake Trail is primitive in nature, and showed signs of only light use. The Dry Pass Trail, to the intersection with the White Sulphur Springs trail, is primitive in nature and has received no recent maintenance. It proved difficult to follow at several sections, and showed signs of only light use. The White Sulphur Springs Trail receives the most amount of use within the Wilderness, and

there is no difficulty in following its tread. Several of the structures are failing (sections of elevated boardwalk and wooden steps). A trail condition survey was performed.

Fish: ADF&G has a permitted fish enhancement project on a lake and stream system that flows into Ford Arm, in accordance with ANILCA provisions. The project was not in operation at the time of the visit, and there was too much snow on the ground to make hiking into the area possible. The ROS in which it is located is Primitive II; however, the camp and fish weir are well upstream from the saltwater, and there is little chance that the permitted activities would detract from the primitive experience of most visitors to the Ford Arm area.

South Baranof Wilderness

In May, a joint ranger boat trip occurred for the purpose of monitoring big game guides, and their interactions with other outfitter/guides during the early spring, shoulder season. The trip was split between Admiralty National Monument and Sitka Ranger District. Much shoreline was patrolled, including that of the eastern portion of South Baranof Wilderness. There were no upland activities observed occurring in the vicinities of any of the eastside bays (Patterson Bay, Gut Bay, Hoggatt Bay and Red Bluff Bay). One recreational boat was observed motoring into Red Bluff Bay.

District personnel were able to participate in a law enforcement over-flight of southern Baranof Island. During the course of that flight, stops were made to review maintenance contract compliance at three public recreation cabins. The cabins are located at Avoss Lake, Davidoff Lake, and Plotnikof Lake. All three cabins are in remote, Semi-primitive Motorized settings. The maintenance work was found to have been within contract specifications. In addition, a temporary outfitter/guide camp at Rakavoi Bay was inspected. The permit holder was found to be in compliance with permit terms and with stipulations developed to protect wilderness values.

Evaluation of Results

Standards and guidelines for management of wilderness are being implemented. Presently, those standards and guidelines are effective in maintaining wilderness as a resource.

The Wilderness Implementation Schedule for the West Chichagof-Yakobi Wilderness Area signed on August 15, 1996, calls for the establishment of a wilderness ranger program. To date, there has not been adequate funding to support such a program. There is need for maintaining a presence during the peak season for monitoring, and for outreach and education. There is anecdotal evidence of non-permitted outfitter/guide activity, and direct evidence of inappropriate activities on the part of Wilderness visitors that could be more effectively addressed through a ranger program. The District is currently working to develop partnerships with groups who might be interested in assisting with the development of a monitoring and outreach program.

Wrangell Ranger District

Monitoring Results

Lands: Wilderness managers keep current on the availability of in-holding parcels within the Stikine-LeConte Wilderness for possible wilderness acquisitions. The wilderness staff and rangers walked 10.5 miles of Wilderness in holding boundaries and monitored evidence of trespass cases.

Special Uses: Wrangell District special use managers and wilderness rangers administer a variety of special use authorizations within the Wilderness to ensure the activities and structures are compatible with Wilderness designation. The authorizations include: outfitter/guides, isolated cabins, pre-ANILCA cabins, tent platforms, and research studies including helicopter landings. All authorizations are monitored for compliance and demonstration of good wilderness ethic.

NEPA Decisions: The wilderness coordinator and a two-person wilderness ranger crew visited Twin Lakes to gather information as required by a 1994 NEPA decision on the management of this popular summer recreation site.

Public Recreation Facilities: The recreation staff and wilderness rangers conducted annual inspections of eleven public recreation cabins and two hot tub facilities. Paid use of the cabins is monitored through the National Recreation Reservation System.

Dispersed Campsite Inventories: The wilderness staff and wilderness rangers began a baseline inventory for all known dispersed campsites.

Biological Studies: The Alaska Department of Fish & Game (ADF&G), the Biological Resource Division of the USGS, and Forest Service wilderness, fish and wildlife, and ecology staff conducted administrative studies on several wildlife species and topics. Studies included monitoring populations of moose and spawning salmon; spring gathering of bald eagles; migration of snow geese; breeding bird surveys; and the eradication of non-indigenous white sweet clover.

Evaluation of Results

Lands: In 1999, the owners of a 160-acre parcel in the Wilderness on Farm Island offered to sell their land to the Forest Service. The property is known as the North King Slough parcel. The parcel was submitted as a FY 2001 land acquisition nomination through the Land and Water Conservation Fund.

The wilderness staff and rangers found no trespass activity along the 10.5 miles of Wilderness in holding boundaries they visited in 1999. New Forest Service boundary signs for ANILCA Wilderness (R-10-27-1) were posted along the boundary during the visits. The in-holding boundaries are on Farm, Sergief and Camp Islands, and had last been visited in 1992/93.

Special Uses: The amount of authorized outfitter/guide use within the Stikine-LeConte Wilderness is monitored annually. Use figures for 1999 are not yet available. Comparisons are made with the latest available data and displayed in Table 41.



West Chichagof-Yakobi Wilderness Area. Bath house and recreation cabin at White Sulphur Springs in Bertha Bay. April 1999.

Table 41. Comparisons of Past Authorized Outfitter/Guide (O/G) Use

| Year | Number of O/G | Service Days | Hours | RVDs ¹ |
|------|---------------|--------------|---------|-------------------|
| 1997 | 11 | 1,545 | 1,332.0 | 22,671.8 |
| 1998 | 17 | 1,743 | 1,008.5 | 17,478.1 |

1. Recreation Visitor Days

In August 1997, the NEPA decision was issued for the Stikine Area Outfitter and Guide Environmental Assessment. Allocations for outfitter/guide use of two study areas comprising the Stikine-LeConte Wilderness were established by this decision. Thresholds for outfitter/guide use in this Wilderness are far from being fully realized in 1997-98.

Special-use authorized structures within the Stikine River drainage in 1999 included: 12 isolated cabins, two pre-ANILCA cabins, four research/monitoring cabins, and 10 tent platform temporary camps. The information gathered is part of special use permit administration in the Wilderness, and is collected for future permit management and administration decisions.

Petersburg High School has been authorized since 1983 to monitor the activity of LeConte Glacier. This project provides measurements of the retreat or expansion of the face of the glacier. All activities, which include helicopter landings, are conducted using the "minimum tool" concept. Information gathered is shared internationally with an ongoing cooperative database on world glaciers for current and future scientific analysis.

The University of Alaska – Fairbanks, Geophysical Institute (UAF-GI) is permitted to conduct three years of research on the dynamics of LeConte Glacier. The research, funded by the National Science Foundation, is aimed at understanding the rapid retreat of a tidewater glacier. All research activities, which include helicopter landings, are conducted using the "minimum tool" concept. As a mitigation measure, UAF-GI will be providing the Forest Service with interpretive information explaining their research.

The US Geological Survey, Water Resources Division is permitted to monitor river flow and water levels of the Stikine River at their gauging station near Shakes Slough. To support this activity, USGS holds an authorization for a cabin and stream gauge. Stream flow information collected is part of an ongoing database available from the USGS web site, and is used for current and future scientific analysis.

The Alaska Department of Fish and Game (ADF&G) is authorized to monitor spawning king salmon populations in tributaries along the Stikine River, particularly on Andrew, Alpine and North Arm Creeks. ADF&G, in cooperation with Canadian Ministry of Fisheries and Oceans personnel, monitored king salmon migration on the Stikine River. To support these activities, ADF&G holds authorizations for two cabins including associated helicopter landings. The collected information becomes part of a database used for future ADF&G management decisions, and to support the International Salmon Treaty negotiations.

NEPA Decisions: In 1994, an environmental analysis and resulting decision was completed which considered alternatives to managing a dock and other recreation-related facilities at Twin Lakes. The decision identified four items to be monitored for up to five years. This monitoring effort ended in 1999.

The following information was obtained:

- A non-indigenous plant list was developed that included dandelion, plantain, annual bluegrass, and reed canary grass.
- A photo history shows that shoreline disturbance has decreased at one site and remained identical at a second location.
- The number of dispersed campfire rings has been limited to two established fire pit locations.
- Twin Lakes visitor use and behavior patterns have not significantly changed over the past five years.

The Twin Lakes NEPA decision also directed management actions in regard to a boat dock. The dock could remain for five years or until it became a safety hazard due to deterioration. In 1998, the dock was noted to be slightly unstable. In the spring of 1999, it was determined the dock was becoming a safety hazard, and should be removed in the autumn season. The dock at Twin Lakes was removed on October 26, 1999.

Recreation Use: Information on use levels and the physical condition of the twelve public recreation cabins and two hot tub facilities within the Wilderness was collected for future management decisions. Data shows that most recreational use occurs during the spring, summer, and fall months. During previous years, information was collected that led to the replacement of the outdoor hot tub, the foundation of the Shakes Slough #1 cabin, the foundation and the roof of the Gut Island #2 cabin, and the deck and woodshed at the Mallard Slough cabin during 1999.

Inventory efforts of existing and potential dispersed campsites along the Stikine River and LeConte Bay were begun in 1999. Five sites were inventoried: Upper Shakes Lake, Doobie Point, Moonshine Creek, Jap Creek, and Cabin Creek. No potential site inventories were completed. This work will result in a database to track the condition of existing dispersed sites and the development of new sites.

The two-person wilderness ranger crew monitored boat traffic on the Stikine River and its adjoining waterways, with special attention to the boats belonging to outfitter/guides during the summer of 1999. An attempt was made to observe traffic in a systematic manner. During June and July, passing boats were monitored at specified locations on designated days. For instance, on Thursdays of five weeks while cruise ships were making scheduled visits into Wrangell (June 3rd, 10th, 17th, 24th, and July 1st) the traffic on Stikine River, Shakes Slough and up Ketili Slough were noted. The above-referenced water routes are often traveled by the Stikine jet boats with cruise ship passengers.

The wilderness rangers kept incidental notes on Stikine River boat traffic on 34 of the 37 days during which they worked this season (June 1- 4, 7-11, 14-18, 22-25, 28-30; July 1-2, 6-8, 26-29; and August 3-6). This effort is in addition to the observations made on each of five Thursdays noted earlier. All collected information will be added to next year's monitoring effort, and used in future management decisions.

Biological Studies: The Alaska Department of Fish and Game conducted flights to monitor moose populations within the Stikine River drainage. The information collected is part of a database used for future ADF&G and Federal Subsistence Board management decisions.

ADF&G also monitors other spawning salmon in most of the anadromous streams in the Stikine-LeConte Wilderness. Surveys were conducted by foot, fixed-wing and/or helicopter. The following creeks were monitored: Andrews, Government, Alpine (Clear) and North Arm, Boat, Ketili-Barns, Coho, Bussy, Cabin, Jap, and Lake, as well as Prunella Slough and Shuktusa Branch. The information collected is also part of the database used for future ADF&G and Federal Subsistence Board management decisions.

Surveys were conducted for the spring gathering of bald eagles and migration of snow geese on the Stikine River delta. Breeding bird surveys were also conducted within the Stikine River drainage. The information collected is made part of an ongoing cooperative database for current and future scientific analysis.

Wildlife biologists from the Forest Service and Biological Resource Division of the USGS established 28 paired exclosure plots within the tidal area on Sergief Island in April 1999. All plot marking and exclosure barriers are temporary, and Forest Service managers utilized the "minimum tool" concept in their decisions. Plots are being monitored as a means to determine the effects of snow goose foraging on wetland plants. Vegetation sampling took place in August 1999. This information will be used to compare plant productivity and composition between the grazed control plots and exclosure plots. The information derived from this study will be used for future snow goose management decisions.

Permanent plots that were established in the Stikine River valley bottom in 1998 to monitor the effectiveness of treatments at eradicating white sweetclover were visited in 1999. All new clover plants were eradicated from the plots. Four new plots were also established to test new eradication treatments on the introduced weed species. Information obtained from this study will be used for future management decisions regarding non-indigenous plants in the Wilderness.

Wilderness Question 2: Are standards and guidelines for the management of wilderness effective in maintaining the wilderness resource?

Monitoring has indicated that Wilderness standards and guidelines are being successfully implemented on the Tongass National Forest and that they are generally effective in preserving the values for which each Wilderness was created. With the Forest Plan direction, Wilderness Implementation Schedules in place for most wildernesses, and the additional direction found in Forest Service Manual 2320, effective and specific guidance for managing the wilderness resources is generally accomplished. However, there are places where Forest Plan standards and guidelines may not be sufficient to protect specific resources. Results from each District varied.

Admiralty National Monument - Brothers Island

Monitoring Results

Wildlife: Several boats, including those permitted by the Forest Service, appeared to be approaching sea lion haul outs closer than the 100 yard minimum distance that is required. Videotape and notes from this potential harassment will be provided to NMFS.

The rapid growth of bear viewing in Windfall Harbor, particularly by outfitter/guides, has led to concerns that bear activity may be affected. Monitoring was conducted this season to help determine the number of visitors, and an environmental assessment is underway to determine how these potential impacts can be minimized and/or mitigated.

Juneau Ranger District

Because of specific monitoring and management in wildernesses, the following list identifies areas of concern where Wilderness standards and guidelines may not be completely met:

- Noise and visual impacts from motorized vessels on adjacent marine waters outside Forest Service jurisdiction.
- Air traffic is increasingly affecting wilderness values.
- Ground and vegetation compaction and disturbance caused by large commercial groups, campers, and commercial crab pot storage.
- Lack of funding to implement Wilderness Implementation Schedules.
- Gravel airstrips within the Wilderness.
- Lack of jurisdiction on marine waters.
- Displacement of wildlife due to noise from motor vessels.
- Development of private in-holdings within wildernesses.
- Illegal outfitting and guiding, particularly high mountain lake areas accessible by floatplanes. Some boat-based illegal outfitting and guiding is also occurring.

Ketchikan/Misty Ranger District

Wilderness represents an array of resources that must be addressed separately in order to define and establish limits when necessary. The large geographic area, complexity, and limited budgets make implementation of standards and guidelines for all resources difficult to monitor for effectiveness.

The Wilderness Ecosystem Inventory Monitoring Program in Misty Fiords National Monument won the 1999 National Aldo Leopold Award for most outstanding and comprehensive wilderness inventory and monitoring program in the Nation. This program is by far the most comprehensive of its kind. This monitoring program utilizes an ecosystem approach to monitoring Misty Fiords National Monument Wilderness. It was implemented in 1997 and continued in 1998 and 1999. This process systematically assesses the status of wilderness conditions from saltwater to alpine using traditional travel routes as transects through Value Comparison Units (VCU's) as the basis for reporting. Conclusions from the area surveyed indicate that backcountry physical impacts are still minimal and the opportunities are outstanding.

Monitoring Results and Evaluation

Generally, standards and guidelines have been effective in preserving the wilderness character with exception to maintaining a low level of social encounters. These social encounters occur along primary travel ways and areas adjacent to waterways at some locations. Air traffic and cruise ship visitation greatly impacts wildlife, visual quality, remoteness and solitude.

There are some inconsistencies and non-conforming activities occurring at some locations. It is often difficult to deal with these impacts due to the jurisdictional issues and varying agency missions that effect multiple resources. For example, the upland management is different than the management of the salt water or air space. Because of this condition, and in the absence of very specific direction and cooperation between agencies, the effectiveness of the standards and guidelines are difficult to evaluate. More cooperation between agencies is needed.

To maintain and improve this condition, a strong education program is needed with continued monitoring to detect changes as early as possible. Social encounters, primarily flight seeing and tour ship traffic, exceed the standards and guidelines outlined in the Tongass Land Management Plan.

Physical use and impacts are increasing; every year brings new outfitter/guide interest, additional kayakers, as well as expedition thrill seekers. These types of experiences are becoming more and more popular. As demand continues to grow for backcountry travel, physical impacts are anticipated.

A collaborative public planning process in the near future is necessary to address elements of wilderness management. Limits of Acceptable Change must be established to address a variety of issues. Limited funding and staffing have prevented development of a comprehensive management plan. Planning would provide better direction and a means to measure more adequately the effectiveness of wilderness Standards and Guidelines. An enforcement plan must also be developed and implemented. An active inventory and monitoring program is critical for detecting change over time.

Petersburg Ranger District

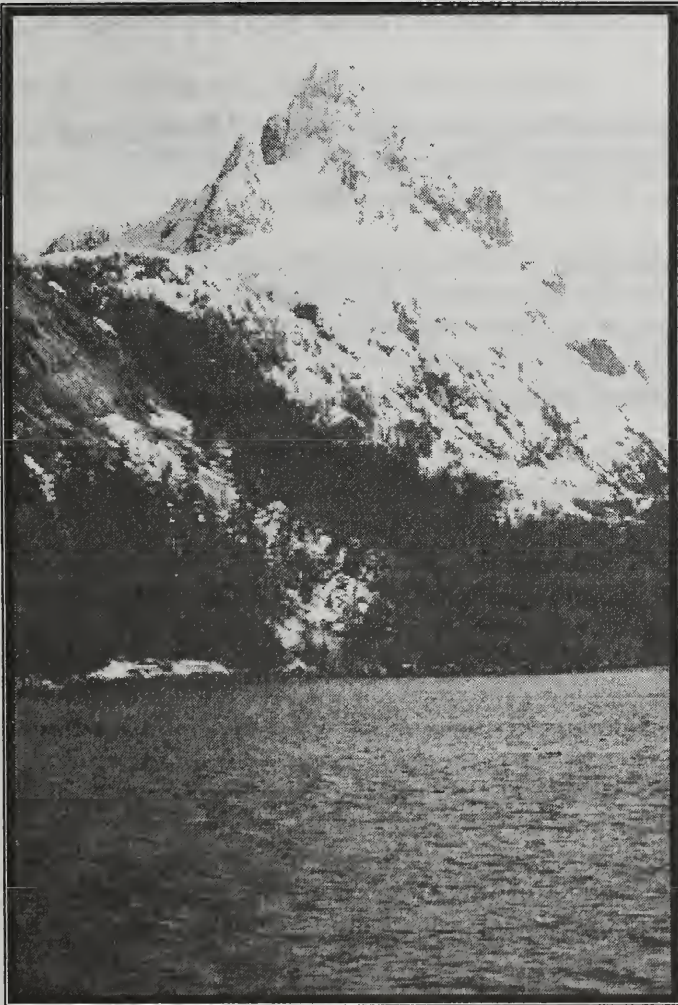
The standards and guidelines are effective in maintaining the wilderness resource, with several exceptions. During a field trip for cabin condition monitoring and maintenance, a wilderness ranger discovered significant quantities of a nonnative plant (Brass buttons, *Cotula coronopifolia*) in the Petersburg Creek-Duncan Salt Chuck Wilderness. Wilderness ranger surveys also found that the portal to Petersburg Creek-Duncan Salt Chuck Wilderness may be exceeding or near exceeding the recommended encounter levels for a wilderness Semi-primitive Motorized ROS class. Use levels at the

mouth of Petersburg Creek need to be monitored more intensively next season to determine if use levels are exceeding the ROS recommended encounters.

The Petersburg Creek-Duncan Salt Chuck Wilderness needs a plant inventory/monitoring program. This was pointed out by the discovery of *Cotula coronopifolia* on the flats of the Duncan Salt Chuck and by aerial photographs, showing the plant has been invading the area for probably a decade. Management of nonnative plants is an important management issue for the Forest Service. The priority for this issue is highlighted in several documents, including the Chief's Natural Resource Agenda, the Forest Service Strategy for Noxious Weeds and Nonnative Invasive Plant Management, the Interagency Wilderness Strategic Plan, and the Alaska Region Recreation Strategy.

Evaluation of Results

For the most part, the standards and guidelines appear to be effective in maintaining the wilderness resource. The large geographic areas and limited budget make it difficult to monitor all resources that comprise Wilderness, but generally monitoring showed that the physical impacts to Wilderness are minimal and well within the levels defined in the applicable standards and guidelines. A few situations exist where impacts associated with activities outside the jurisdiction of the wilderness affect the wilderness.



South Baranof Wilderness Area. Mt. Ada as seen from Gut Bay. May 1999

Wildlife

Goal: Maintain the abundance and distribution of habitats, especially old-growth forests, to sustain viable populations in the planning area. Also, maintain habitat capability sufficient to produce wildlife populations that support the use of wildlife resources for sport, subsistence, and recreational activities.

Objectives: In addition to objectives included in Biodiversity, design and implement non-structural wildlife habitat improvement projects to improve an average of 8,000 acres annually across the Forest. Include a young-growth management program to maintain, prolong, and/or improve understory forage production and to increase future old-growth characteristics in young-growth timber stands for wildlife. Additionally, design and implement an average of 75 structural wildlife habitat improvement projects annually across the Forest.

Background: The Tongass National Forest provides habitat for 54 species of mammals (including the recently introduced elk on Etolin Island), 231 species of birds, and five species of amphibians and reptiles. There are an additional 18 species of marine mammals found in Southeast Alaska waters that depend entirely on the ocean environment, and 45 bird and 3 amphibian or reptile species considered casual or accidental visitors to Southeast Alaska. These species provide many opportunities for consumptive and non-consumptive uses, including commercial, sports, and subsistence hunting and photographic and viewing activities. The Forest is rich in its varied and unique species; some of the species found on the Forest in relative abundance (such as bald eagle and brown bear) are threatened or endangered in other parts of the United States.

Wildlife Question 1: Are population trends for Management Indicator Species and their relationship to habitat changes consistent with expectations? (Also see the Biodiversity monitoring questions.)

In last year's report we concluded that the list of MIS needed to be updated and that current TLMP wildlife monitoring questions are too broad to develop useful monitoring protocols (E.DeGayner, C.Crocker-Bedford and D. Aho, 1999). The Information Needs section of TLMP (Appendix B of the MIS report) and the Administrative Study Information Needs Assessment (ASIAN) (Inversion et al. 1998) were particularly useful in selecting MIS and further defining and integrating these monitoring questions.

We proposed that the updated list of MIS and current TLMP fish and wildlife monitoring questions be reframed as presented in Table 42 to more tightly tie them with management issues. This table links the monitoring questions with potential environmental "stressors" (i.e., management activities) and in turn links "stressors" of ecosystem integrity with potential MIS species. As described by Noon et al. (1997), "indicators" of ecological stress have some aspect of the biology of the species that can be measured and are influenced by the anthropogenic stressor. Subsequent, species-specific task groups will identify the actual "indicators" -- the actual parameter to be measured during monitoring. Potential indicators include parameters such as population density, abundance, site fidelity, reproductive rate, mortality rate, home range size, population structure, and so forth. The species-specific task groups will likely select indicators based on their apparent demographic significance, along with the potential to discern (at a reasonable cost) differences in the indicators between landscapes that have been treated differently.

Interagency species-specific task groups will develop formal monitoring protocols in FY 2000, which will address these management questions and trends in MIS habitat/populations. In the meantime, the Forest Service is supporting several monitoring activities and administrative studies that will be useful for addressing these issues. Table 43 summarizes these activities.

Table 42. Refinement of TLMP Monitoring Questions linked to Stressors, Potential Response MIS, and key forest management issues.

Issue 1: Effects of Management on Landscape structure and composition on species abundance/persistence (adopted from Iverson et al. (1998).

| # | Questions | Stressors | Potential Response MIS |
|-----|--|--|---|
| 1.a | Reserve system efficacy | Forest fragmentation, habitat loss | HCA design species ¹ used by Suring et al. (1993) |
| 1.b | Landscape strategies - animal dispersal/movement facilitation | Forest fragmentation | Flying squirrel , red-back vole VPOP design species |
| 1.c | Effects of partial harvest systems relative to clearcutting | Removal of trees | Marten, flying squirrels, deer, goshawk , goshawk prey species |
| 1.d | Effects of timber harvest on populations and, in some cases, human use of these populations. | Conversion of old forest to young forest | Deer , marten, forest birds |
| 1.e | Riparian Buffer Efficacy | Example: exposure to wind and blowdown | Dolly Varden, Cutthroat trout, Coho, and pink salmon |
| 1.f | Others identified by task groups | | |

1. species most influential in the size, composition, and spacing of reserves

Issue 2: Effects of human disturbance on wildlife.

| | Questions | Stressors | Potential Response MIS |
|-----|--|--|---|
| 2.a | Efficacy of access management strategies | Road and beach access (S&Gs) | Brown bear, marten, wolf , black bear |
| 2.b | Effects of human disturbance during permitted activities | Road construction, tourism, flight seeing. | Mountain goats, bald eagles, swans, sea lions, harbor seals |
| 2.c | Effects of human disturbance during facility use | Waste management, Defense of Life and Property | Brown bear , black bear, harbor seals |

Table 43. FY 1999 monitoring activities.

| MIS Candidate Species | Fy 1999 Monitoring Activities Conducted by the Forest Service | Activities by Others Likely to Contribute to Long-term Monitoring Efforts. |
|--------------------------------------|--|---|
| Black-tailed Deer | 1) AD&G and FS conducted annual pellet count surveys. 2) Mitkof Islands habitat use study and model habitat model review. | ADF&G Heceta deer/wolf study (in 4 th year). |
| Wolf | 1) Established 4-yr Challenge Cost Share Agreement with ADF&G to study deer/wolf interactions and wolf biology. 2) Pilot project with Petersburg ADF&G to estimate wolf numbers and movements. | ADF&G Heceta deer/wolf study (in 4 th year). Contact: Dave Person/Chris Farmer. |
| Flying Squirrel | 1) FSL flying squirrel study on POW island completes 2 nd year. 2) Mitkof Island flying squirrel den study (final year, report spring 2000). Contact K.Hastings, D. Magnuss, V.Bakker) | Flying squirrel taxonomy in SE AK. (Joe Cook at UA, Fairbanks). |
| American Marten | | ADF&G analysis of marten data from NE Chichagof Island. |
| Northern Goshawk | 1) Annual nest monitoring conducted by ADF&G and FS. 2) FS and ADF&G entered into a agreement to update the Conservation Assessment for the Northern Goshawk in SE AK (Iverson et al, 1996) with new information. | |
| Brown Bear | | ADF&G analysis of brown bear data on Chichagof Island. |

Wildlife Question 2: Are the population levels and associated distribution of mammalian endemic species on islands and portions of the mainland consistent with the estimates in the Forest Plan?

According to the TLMP Monitoring and Evaluation Guidebook, this question is answered through an annual report on the progress of the small mammal study specified in the Information Needs section of the Forest Plan (Appendix B-2, Forest Plan). This study is continuing through the year 2000. Additional information describing this study is included in the Research section of this report.

Monitoring Results

The Mammal Fauna of Southeast Alaska

In August 1999 the University of Alaska Museum (since 1992 the cost-share partner of the US Forest Service in the study of the biogeography and endemism of the mammals of Southeast Alaska) published "The Mammal Fauna of Southeast Alaska", by S.O. McDonald and J. A. Cook. This 145-page publication summarized the results of cost-share surveys of small mammals through July 1999.

This study contributes information to evaluate distribution and endemism in small mammals in Southeast Alaska. Federal legislation in NEPA 1973, ESA 1973, NFMA 1976 mandated conservation of biological diversity. This study contributes information to fulfill commitments in the TLMP ROD and Forest Plan to evaluate the biodiversity of endemic mammals.

In the executive summary of their report, McDonald and Cook state that "[a] primary facet of biodiversity is the ability to recognize and conserve unique (endemic) taxa." Specific concerns associated with endemic mammal biodiversity are related to forest fragmentation, tracts of second growth stands of closed canopy forest, and the highly insular landscape of Southeast Alaska. According to McDonald and Cook, the

forest fragmentation of the old-growth rain forest resulted in tracts of second growth that generally support a less diverse mammal fauna. They also found that the separation of wildlife by sea and glacier resulted in "an apparently high level of biotic endemism".

The publication displayed the taxonomic distribution among locales in Southeast Alaska of 6,000 specimens. This study documents the 78 species of mammals known to be in Southeast Alaska. One of many findings is: "Some 27 mammal taxa are endemic to the region and an additional 11 taxa have ranges that are largely confined to Southeast Alaska; probably the largest number of endemic mammals of any US National Forest." Despite extensive trapping from 1992 through 1999, and consideration of previous collections from Southeast Alaska, "59 species (76 percent) are known from fewer than 20 specimens." Additional information is needed on distribution and taxonomic status for most mammals in Southeast Alaska.

Density and Demography of Endemic Small Mammals

During 1999, the USFS Forest Science Laboratory in Juneau continued a study of the habitat relationships of Prince of Wales flying squirrels, and a study of the habitat relationships of red-backed voles. The focus of the study is to determine habitat relationships and estimate density of these two endemic-mammal species. This is the second field season of work that was completed on six study sites of two prominent cover types on Prince of Wales Island and eight study sites of four cover types on Wrangell Island.

The objectives for the study include documenting the following in commercial forest habitat:

- density of POW flying squirrel in productive old growth and mixed conifer habitats;
- age and sex composition of study grids samples;
- number of reproductive females; and
- microhabitat features associated with capture of individuals age and sex groups.

This study provides data to satisfy the commitments of the TLMP ROD and Forest Plan to increase small endemic mammal studies. This project provides baseline ecological information regarding habitat distribution and abundance among four important habitats for species endemic to Southeast Alaska. This information will contribute to a habitat model that potentially may be utilized in determining the habitat needs and potential effects of timber harvest in preferred habitat.

Evaluation of Results

No small mammal findings suggest any changes to TLMP at this time. The flying squirrel and red-backed vole field work should be completed in October 2000. No evaluation has been completed to date.

Costs and Outputs

Costs and Outputs Question 1: What outputs were produced in the previous year?

Monitoring Results

Resource Schedules

Fish Habitat Enhancement

| | <u>Projects</u> |
|-----------------------------------|-----------------|
| Small Instream Structures | 31 |
| Fishways | 26 |
| Barrier Modification | 14 |
| Spawning Channels | 2 |
| Rearing Ponds/off channel rearing | 3 |
| Barren Lake Stocking | 5 |
| Cooperative Fish Stocking | 11 |
| Incubation boxes | 5 |
| Lake Fertilization | 5 |
| Debris Removal | 0 |
| Weir/stock Assessment | 17 |
| Riparian Rehabilitation | <u>39</u> |
| Total Projects | 158 |

Recreation Facility Construction and Recon. Capital Investments

| | <u>Capacity</u> |
|--|-----------------|
| Mendenhall Glacier Campground Rehab | |
| Mendenhall Visitor Center | |
| Yakutat Dunes Picnic Area | |
| Yakutat Dunes Pavilion | 60 |
| Harris River Campground | 75 |
| Recreation Cabin Outhouse Replacements | |
| Recreation Cabin Foundation and Deck Replacement | |
| Mt. Edgecumbe Trail Shelter | |
| Fish Creek Wildlife Observation Site | |

Trail Construction and Recon. Capital Investments

| | <u>Miles</u> |
|----------------------------------|--------------|
| Ketchikan Trail & Site Easements | 3.4 |
| Eagles Nest Trail | 1.9 |
| Mt. Edgecumbe Trail, Phase 2 | 1.7 |
| Blind River Trail, Phase 2 | 0.2 |

Road Management Planning

Road Management Objectives

Scenery Management

- 1) Ecological Land Use Delineation
- 2) Concern Level Ratings
- 3) Viewshed Mapping
- 4) Visual Absorption Capability

Timber Harvest

| | | |
|----------------------------|-------------|---------------|
| Average Annual Sell Volume | Saw/Utility | 145.8 MMBF/yr |
|----------------------------|-------------|---------------|

Watershed Restoration

- Watershed Analysis protocol development
- Update Area Projects list in Watershed
- Maybeso watershed restoration
- Nakwasina watershed restoration
- Number of single year type projects, per year

Wildlife

| | |
|--|---------|
| Acres of Habitat Improved | |
| Number of structures constructed | |
| Acres inventoried, monitored, or studied to benefit: | |
| Amphibians | 6,200 |
| Wildlife | 196,835 |
| Birds | |
| bald eagles | |
| marbled murrelet | |
| waterfowl and shorebirds | |
| forest birds | |
| deer | |
| Alexander Archipelago wolf | |
| bear | |
| furbearers | |
| other species | |

Threatened, Endangered and Sensitive Species

| | |
|--|---------|
| Acres of habitat improved | |
| Number of structures constructed | |
| Acres inventoried, monitored, or studied to benefit: | 348,700 |
| Fish (miles of streams, acres of lakes) | 30 |
| Birds | |
| goshawk | |
| Plants | |
| Marine Mammals | |

Nature-watch Program

- Number of Viewing Sites Developed
- Number of presentations
- Number of multimedia products

Evaluation of Results

The monitoring results show a partial list of the resource schedules completed in 1999. The source for information in the MARS report. In the future, the National resource information System will also be utilized as a source for project output data.

Costs and Outputs Question 2: Are the costs associated with carrying out the planned management prescriptions (including those of producing outputs) consistent with those costs estimated in the Forest Plan?

Monitoring Results

The tables below present the cost outputs by Expanded Budget Line Item (EBLI) and Management Attainment Report (MAR) for carrying out the planned management prescriptions, including those of producing outputs, for the Forest Plan in fiscal year 1999.

Evaluation of Results

The budget associated with the implementation of the Forest Plan is higher than expected and the level of outputs lower than expected. The result is a much higher unit cost. For example, the unit cost for timber sales is three times greater than originally estimated. It is unclear if this is a one-year occurrence or a trend.

Recommendation: Re-evaluating the unit cost currently being used in the budgetary process.

First Decade Average Annual Budget by Resource Line Item

| EBLI | | TLMP ANNUAL BUDGET | SPENT FY 1999 |
|-------------|---------------------------------|--------------------------|------------------|
| ===== | | ===== | ===== |
| NFEM | Ecosystem Plan/Inv/Monitor | \$4,380,000 | \$3,112,283 |
| NFMG | Minerals and Geology | 1,275,000 | 1,147,87 |
| NFLA | Real Estate Mgmt | 1,030,000 | 1,191,291 |
| NFLL | Landline Location | 300,000 | 53,974 |
| NFFA | Facilities Maintenance | 625,000 | 883,335 |
| NFLE | Law Enforcement | 220,000 | 361,068 |
| NFRD | Road Maintenance | 1,335,000 | 1,849,010 |
| NFTM | Timber Management | 14,230,000 | 19,842,546 |
| NFFV | Forest Veg. Management | 2,835,000 | 1,577,701 |
| NFRM | Recreation Management | 5,070,000 | 4,267,424 |
| NFWM | Wilderness Management | 1,790,000 | 1,665,685 |
| NFHR | Heritage Resources Mgmt | 690,000 | 368,521 |
| NFWL | Wildlife Operations and Mgmt | 1,290,000 | 1,085,659 |
| NFIF | Inland Fish Operations and Mgmt | 375,000 | 381,589 |
| NFAF | Anad Fish Ops and Mgmt | 5,000,000 | 3,644,926 |
| NFTE | T&E Species Ops and Mgmt | 670,000 | 255,555 |
| NFSO/SI | Soil-Water-Air | 1,000,000 | 849,842 |
| NFGA | General Admin. | 6,770,000 | 5,689,191 |
| WFPR | Fire Management/Suppression | 490,000 | 513,574 |
| CNFA | Facilities Recon & Const. | 1,300,000 | 1,292,160 |
| CNRF | Recreation Construction | 4,000,000 | 7,708,819 |
| CNTM | Timber Road Construction | 10,650,000 | 7,685,131 |
| CNGP | General Purpose Road Const. | 1,000,000 | 751,706 |
| CNRN | Recreation Road Const. | 600,000 | 1,192,912 |
| CNTR | Trail Construction | 2,000,000 | 2,664,873 |
| Total Costs | | 68,925,000 | 70,336,650 |
| | | | |
| CWKV | KV | 1,260,000 | 409,017 |
| SSSS | Salvage Sale | 1,400,000 | 2,080,506 |

Total 2,660,000 2,489,523

**MANAGEMENT ATTAINMENT REPORT
TONGASS NATIONAL FOREST**

FY 1999

| MAR # | FUND | UNIT OF MEASURE | Accom. |
|--|-----------|-----------------|------------|
| CR-RD RECONS Road Reconstruction | CNRD | Miles | 54.4 |
| CR-TR Trail Const & Reconstruction | CNTR | Miles | 7.75 |
| EM-HERT Heritage Inventory | NFIM | Acres | 4,394 |
| EM-L-AQBIO Lake Aquatic Biota Inven. | NFIM | Acres | 6,200 |
| EM-LRMP-M&E LRMP Monitoring/Evltn | NFIM | Reports | 2 |
| EM-RIVSR-INV Rvrn Strm R/C Unt Scl Inv | NFIM | Miles | 24 |
| EM-RIVSS-INV Rvrn Vly Sgmt Scl Inv | NFIM | Miles | 4.5 |
| EM-S-AQBIO-I Strm Aquatic Biota Inv | NFIM | Miles | 2 |
| EM-SUB-RVR-A Ecsrgn scsn RvB/S Ast Cpl | NFIM | Assessments | 1 |
| EM-TES-INV TE&S Spcs Hab. Inventory | NFIM | Acres | 18,700 |
| EM-TEUI-LND TEUI at Landscape Level | NFIM | Acres | 330,000 |
| EM-WL-HAB-IN Wildlife Hab. Inventory | NFIM | Acres | 196,835 |
| FM-REF-APPR Reforestation | NFFV | Acres | 1,744 |
| FM-REF-KV Reforestation | CWKV | Acres | 6,608 |
| FM-TSI-APPR TSI | NFFV | Acres | 4,260 |
| FM-TSI-KV TSI | CWKV | Acres | 579 |
| FM-VOL-HAR-T Volume Harvested – Total | NFTM/SSSS | CCF | 350,436.32 |
| FM-VOL-HV-TB Volume Harvested – Total | NFTM/SSSS | MBF | 145,759.54 |
| FP-Capability Fire Protection Capability | WFPR | Dollars | 97,200 |
| LA-ROW-ACQ Rights-of-Way Acquired | NFLA | Cases | 17 |
| LM-LL-Maint Landline Maintenance | NFLL | Miles | 6.5 |
| LM-LL-New New Boundary Marked – Std | NFLL/TM | Miles | 68.5 |
| LM-LND-Class Land Classification | NFLL | Cases | 11 |
| LM-S-Boundry Special Area Boundary Loc | NFLL | Miles | 6 |
| LM-SU-APPL Special Uses App Proc | NFLA | Permits | 61 |
| LM-SUP-STD Special Use Pmt Adm – Std | NFLA | Permits | 438 |
| MG-BNE-OP-AD Bnd N-Ergy Op Adm to Std | NFMG | Operations | 34 |
| MG-BNE-OP-PR Bnded N-Ergy Operate Pro | NFMG | Operations | 34 |
| MG-GEO-MA-AD Geologic Mgmt Areas Admin | NFMG | Areas | 3 |
| MG-GEO-PER Geologic Permit/Reprt Doc | NFMG | Documents | 18 |
| MG-N-BNE-OP N-Bnd N-Ergy Operate Pro | NFMG | Operations | 85 |
| MG-T-BNE-OP Total Bonded Non-Ergy Op | NFMG | Operations | 43 |
| RD-DECOMM Roads Decommissioned | CNRM | Miles | 39.2 |
| RD-FUL-MAINT Roads Fully Maintained | CNRM | Miles | 2,977 |
| RG-NOX-WD-TR Noxious Weed Treatment | NFRV | Acres | 2.4 |
| RM-HERT-EVAL Heritage Sites Evaluated | NFHR | Sites | 47 |
| RM-HERT-INTP Heritage Sites Interpretd | NFHR | Sites | 23 |
| RM-HERT-P&P Heritage Sites Prsv/Prtct | NFHR | Sites | 120 |
| RM-PAOTS-TOT Seasonal Cap Avail – Tot | NFRM | PAOT Days | 2,295,549 |
| RM-SU-ADMIN Rec Special Uses – Adm | NFRM | Permits | 364 |
| RM-TRAIL-SYS Rec Trails on System | NFTR | Miles | 535.9 |
| RM-WLDTR-SYS Wilderness Trails on System | NFTR | Miles | 95.5 |
| SW-RES-IMP Soil & Water Res Improve | NFSI | Acres | 167 |
| WL-AF-LAK-RE Anad Fish Lake Res/Enhanc | NFAF | Acres | 4,777 |
| WL-AF-STE-RE Anad Fish Strm Res/Enhanc | NFAF | Miles | 95.5 |

| | | | |
|--|------|-------|-----|
| WL-BIO-A&E Biological Assessment/Eval | NFWL | Tasks | 30 |
| WL-IF-LAK-RE Inlnd Fish Lakes Res/Prot | NFIF | Acres | 853 |
| WL-IF-STR-RE Inlnd Fish Stream Res/Pro | NFIF | Miles | 17 |
| WL-THAB-RES Trst Wldlf Hbt Rst/Enhncd | NFWL | Acres | 326 |

Recommendations:

Reevaluate the unit costs currently being used in the budgetary process.



References

- American Fisheries Society Special Publication. 1991. *Influences of Forest and rangeland Management of Salmonid Fishes and Their Habitats*. 19:297-323, 1991
- DeGayner, E.J, D.C. Crocker-Bedford, and D. Aho. A Reassessment of Management Indicator Species for the Tongass National Forest. Forest Service, Alaska Region, Juneau, AK.
- Iverson G. C. 1997. Analysis of Revised TLMP Old-Growth Habitat Reserves and VPOP HCAs. TLMP Revision Planning File, unpublished report. 25pp.
- Iverson, G., C. Crocker-Bedford, E.J. DeGayner, T. Schenck and L. Suring. 1998. Administrative study information needs assessment. USDA Forest Service, Alaska Region, Juneau, AK.
- Iverson, G.C., G.D. Hayward, K. Titus, E. DeGayner, R.E. Lowell, D.C. Crocker-Bedford, P.F. Schempf and J. Lindell. 1996. Conservation assessment for the northern goshawk in southeast Alaska. USDA Forest Service Gen. Tech. Rep. PNW-GTR-387, Juneau, AK.
- Kahler, Thomas and Thomas Quinn. 1998. Juvenile and Resident Salmonid Movement and Passage through Culverts. Washington State DOT. July 1998.
- Landwehr, Dennis J. 1994. The Use of Low Elevation Oblique Aerial Photographs to Monitor Soil Quality Standards on Extremely Steep Slopes. Ketchikan Area Watershed Group. Unpublished Monitoring Report. October 1994.
- Landwehr, Dennis J. 1997. Soil Disturbance on the 89-94 FEIS Long-term Sale Area - Compilation of Reports. Internal document.
- Landwehr, Dennis J. 1998. The Effectiveness of Standards and Guidelines in Preventing Additional Mass Movement. An 89-94 KPC FEIS Monitoring Report. Ketchikan Area Watershed Group. February 1998.
- Landwehr, Dennis J.; and Nowacki, G. 1999. Statistical Review of Soil Disturbance Transect Data Collected on the Ketchikan Area, Tongass National Forest. Internal Document. February 1999.
- Landwehr, Dennis J. 1999. Inventory and Analysis of Landslides Associated with 89-94 KPC LTS Units and Roads On the Thorne Bay Ranger District. Ketchikan Area Watershed Group. February 1999.
- Mulder, B.S., B.R. Noon, T.A. Spies, M.G. Raphael, A.R. Olsen, C.J. Palmer, G.H. Reeves, and H.H. Hart. 1997. *The Strategy and Design of the Effectiveness Monitoring Program for the Northwest Forest Plan*. Final Report of the Effectiveness Monitoring Team for the Northwest Forest Plan. Intergovernmental Advisory Committee. USDA For. Ser. Pacific Northwest Research Station, Portland, OR.
- Noon, B.R., T.A., Spies, and M.G. Rapheal. 1997. *Conceptual Basis for Designing an Effectiveness Monitoring Program*. Final Report of the Effectiveness Monitoring Team for the Northwest Forest Plan. Intergovernmental Advisory Committee. USDA Forest Service, Pacific Northwest Research Station, Portland, OR.
- Swanston, D.N., Shaw, C.G., Smith W.P., Julin, K.R, Cellier, G.A., Everest, F.H. 1996. Scientific information and the Tongass Land Management Plan: key findings derived from the scientific literature, species assessments, resource analyses, workshops, and risk assessment panels. USDA For. Ser. Gen. Tech. Rep. PNW-GTR-386, Juneau, AK.

- USDA-Forest Service 1999. Record of Decision -- Tongass Land and Resource Management Plan. April 1999. USDA Forest Service. Washington DC, Doc. No. FS-639.
- USDA-Forest Service 1999. Road Condition Survey Protocol. Forest Service Transportation System Maintenance Handbook FHS 7709.58-99-1.
- USDA-Forest Service 1998. Canal Hoya Timber Sale, FEIS. USDA Forest Service, Tongass National Forest, Juneau. R10-MB-363.
- USDA-Forest Service 1998. Control Lake Timber Sale, Record of Decision. USDA Forest Service, Tongass National Forest, Juneau. R10-MB-369c.
- USDA-Forest Service 1998. Crystal Creek Timber Harvest, Record of Decision and FEIS. USDA Forest Service, Tongass National Forest, Juneau. R10-MB-364.
- USDA-Forest Service 1998. Chasina Timber Sale, FEIS Record of Decision USDA Forest Service, Tongass National Forest, Juneau. R10-MB-365c.
- USDA-Forest Service 1998. Nemo Loop Timber Sale, Environmental Assessment, Decision Notice, and Finding of No Significant Impact. USDA Forest Service, Tongass National Forest, Juneau. R10-MB-361a.
- USDA-Forest Service 1998. Niblack Lakes and Streams Forest Plan Amendment EA . USDA Forest Service, Tongass National Forest, Ketchikan.
- USDA Forest Service. 1997. Land and Resource Management Plan. Tongass National Forest. USDA Forest Service, Alaska Region, R10-MB-338dd. Juneau, AK.
- USDA Forest Service. 1997. Todahl Backline Timber Harvest, FEIS Environmental Assessment. USDA Forest Service, Tongass National Forest, Juneau. R10-MB-351.
- USDA-Forest Service 1997. Tongass Land and Resource Management Plan. USDA Forest Service, Alaska Region, Juneau. R10-MB-338.
- USDA Forest Service. 1989. Ketchikan Pulp Company Long-term Sale Area Final Environmental Impact Statement for the 1989-94 Operating Period. R10-MB-66a. et al. USDA Forest Service, Alaska Region, Juneau Alaska.
- USDA Forest Service. 1982. National Forest System land and resource management planning, Code of Federal Regulations 36, Sec. 219.19, on fish and wildlife planning. *Fed. Register* 47(190): 43026-43052.

APPENDIX

Tongass Best Management Practices Implementation 1999 Monitoring Report

compiled by
Bruce Sims and Carol Seitz-Warmuth

MONITORING QUESTION

The 1997 Tongass National Forest Land and Resource Management Plan gave specific direction for monitoring. This report addresses Soil and Water question 3: Are the Best Management Practices being implemented?

OBJECTIVE and GOAL

This monitoring report presents analysis to determine if Best Management Practices are properly implemented on the Tongass National Forest and documents this determination.

BACKGROUND

The Best Management Practices (BMPs) were monitored on the Tongass through guidelines described in the Tongass Monitoring Strategy developed to provide direction for Tongass Land Management Plan implementation monitoring. The specific Best Management Practices monitored were selected based upon potential risk factors to soil and water resources by an interagency team of representatives from the Forest Service and Alaska Department of Environmental Conservation then reviewed by members of the Monitoring and Evaluation Group (IMEG). The BMPs evaluated are included in the Soil & Water Conservation Handbook (Forest Service Handbook 2509.22, October 1996). Soil and water effectiveness monitoring is completed through monitoring the soil quality standards as described in Forest Service Manual 2554. The soil and water effectiveness monitoring will be summarized in the 1999 Tongass Land Management Plan Monitoring Report.

The BMP implementation monitoring included two distinct monitoring efforts:

(1) 100% monitoring of all harvest units and all construction or reconstruction of roads by timber sale administrators, engineering representatives, and other specialists of the units which have had final inspection to insure compliance with contract specifications. The monitoring results were recorded on forms that list the attributes of BMPs, and units of measure.

(2) The 10% interdisciplinary team (IDT) monitoring was conducted on a stratified random sample of at least 10% of the units and roads monitored during the 100% monitoring effort. Monitoring group participation included engineering representatives, sale administrators, engineers, foresters, planners, regulators, and resource specialists from soils, water, and fisheries.

The monitoring team intentionally selected watersheds that were more likely to have problems. Those that had high concentrations of streams and high mass movement soils were sought out. The monitoring results are recorded the same forms used in the 100% monitoring effort.

The 10% IDT monitoring was conducted in an effort to provide some quality control on the 100% monitoring and afford the opportunity for other agency representatives to relate their interpretation of the BMPs and implementation to Forest Service resource specialists, timber sale administrators, and engineering representatives.

The 10% IDT monitoring was conducted following a four-step process:

1. The IDT reviewed office files and documents referencing the roads and units for information about mitigation and modifications between planning and project implementation. Sources included the NEPA

documents, decision documents, planning files, layout cards, road design cards and plans, and inspection reports from the road and timber contract administration.

2. The IDT conducted a field review with the timber sale administrator or engineering representative responsible for project implementation, and filled out forms identical to those used during the 100 % monitoring. The BMP ratings were assigned on a consensus basis, with dissenting opinions noted on the monitoring form.
3. The IDT reviewed the 100% monitoring forms filled out by the sale administrator or engineering representative, and discussed and discrepancies in the forms.
4. The IDT summarized their findings on BMP implementation, noting their monitoring conclusions relative to the monitoring completed by the sale administrators and engineering representatives.

All monitoring information was collected, tabulated and summarized. Specifically this entailed recording and tabulating the 100% monitoring form information. Comments, recommendations and conclusions developed by the 10% IDT monitoring group are attached.

MONITORING PROCEDURES

The monitoring forms are in a tabular format. Different sections of this form apply to roads and/or units. The BMPs are listed with some of the monitoring attributes that should be monitored. The respective unit numbers, stream classes, BMP ratings, units in compliance, corrective action required, corrective action implemented, departures, and comments are listed for each applicable BMP. A column is also included for the person to initial and date their monitoring effort.

The following BMP rating system was implemented on the forms:

- F= BMP Fully Implemented
- D= Departure from Full Implementation
- N= BMP not Implemented

BMPs rated "D", or "N" were noted even if corrective action was taken. Where corrective action was taken, a departure from full BMP implementation was noted but the unit was listed as "F", fully implemented.

The following options were specified for departure:

- SE = Site evaluation
- EA = Environmental Analysis
- CT = Contract
- LO = Layout
- AD = Administration

The units and roads were monitored for various applicable BMPs. If the BMP did not apply it was not rated. For example, if the unit or road did not contain any streams, the BMPs applicable to streams were not rated. The specific BMPs rated included:

- BMP 13.5 Identification & Avoidance of Unstable Areas
- BMP 12.6 Riparian Area Designation & Protection
- BMP 12.6a Buffer Zone Design & Layout
- BMP 12.17 Revegetation of Disturbed Areas
- BMP 13.16 Stream Channel Protection
- BMP 13.9 Yarding Systems to Protect Soil/ Water Resources
- BMP 13.11/14 Erosion Control Measures
- BMP 12.5 Wetlands Protection Measures
- BMP 14.6 Timing Restrictions for Construction Activities/ Fisheries Prescription
- BMP 13.11/14 Erosion Control Measures- Temporary Roads

BMP 12.8 Oil Pollution Control Measures
BMP 14.7 Measures to Minimize Mass Failures
BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation
BMP 14.12 Control of Excavation & Sidecast
BMP 14.14/ 14.17 Bridge/ Culvert Design, Installation & Removal
BMP 14.18 Control Rock Pit Sediment
BMP 14.19 Disposal of Slash & Stumps
BMP 14.20/ 14.22 Road Maintenance Access Management

MONITORING CONTEXT

Planning for some of the roads and units was conducted before the Soil and Water Conservation Handbook was revised in October 1996, and new Forest Plan Standards and Guidelines were approved in the May 1997. Both documents included many improvements in how we protect soil and water resources. Several important changes in the 1996 Soil and Water Conservation Handbook include improving wetlands management direction, considering stream buffer windthrow, and generally making Forest Service BMP's consistent with State Forest Practices Regulations. A few of the important changes included in the 1997 Forest Plan Standards and Guides resulted in both new stream class definitions and stream protection measures required for each stream class and channel type. Buffer strip protection of Class III streams was entirely new.

MONITORING RESULTS

The 100% monitoring effort is summarized in Table 1. This table displays the total number of times each specific BMP was rated, the number of times it was fully implemented, number of times it showed a departure from full implementation, and the number of times departures from full implementation of BMPs were corrected. It is important to understand that in most cases where departures were observed corrective action was taken so that the BMP was fully implemented before the unit or road was approved by either the Sale Administrator or Contracting Officers Representative. In a few cases, action plans were drawn up as a result of the monitoring to complete additional work so the BMP would be fully implemented.

Table 1, SUMMARY OF BMP USE, NUMBER OF DEPARTURES AND CORRECTIVE ACTIONS

| BMPs Applied | Number of Times the BMP was Appropriate for Use | Number of Departures from BMP Implementation | Number of Times Corrective Action Did Not Bring Action into Full Compliance with BMP |
|---------------|---|--|--|
| 13.5 | 29 | 1 (3.4%) | 0 |
| 12.6/12.6a | 42 | 8 (19%) | 3 (7.1%)* |
| 12.6a | 55 | 0 | 0 |
| 12.17 | 6 | 1 (16.6%) | 0 |
| 13.16 | 79 | 0 | 0 |
| 13.9 | 88 | 0 | 0 |
| 13.10 | 95 | 1 (1.1%) | 0 |
| 13.11/13.14 | 126 | 0 | 0 |
| 12.5 | 44 | 0 | 0 |
| 14.6 | 36 | 1 (3.8%) | 0 |
| 14.5 | 90 | 0 | 0 |
| 12.8 | 109 | 1 (0.9%) | 0 |
| 14.7 | 22 | 0 | 0 |
| 14.8/12.17 | 46 | 0 | 0 |
| 14.9 | 61 | 1 (1.6%) | 0 |
| 14.12 | 23 | 0 | 0 |
| 14.14/14.17 | 44 | 0 | 0 |
| 14.18 | 34 | 1 | 0 |
| 14.19 | 55 | 0 | 0 |
| 14.20/14.22 | 60 | 0 | 0 |
| TOTALS | 1,125 | 14(1.2%) | 3 (0.2%) |

*6 trees were harvested from one Class II buffer and 4 trees from one Class I buffer plus one helicopter landing was located within a Class I riparian zone.

EVALUATION of 100% MONITORING RESULTS

The results show that the Tongass has successfully implemented the Best Management Practices. The following table summarizes the number of times each BMP was implemented and the number of times a departure from implementation was noted.

A total of 3249.5 acres were reported as having been harvested in 106 units and 66 road segments were constructed or reconstructed in 1999. Average unit size was 31 acres. Departure from BMP implementation was reported a total of 16 times. BMP 12.6, Riparian Area Designation and Protection was reported 7 times and BMP 12.6a Buffer Zone Design and Layout was reported once. With three exceptions corrective action was taken to bring the units and roads into full compliance. Full compliance was not obtained where 6 trees were harvested within a Class II buffer and at a second site where 4 trees were harvested within a Class I buffer. In addition, full compliance for BMP 12.6 and 13.10 Landing Location and Design was not obtained in one unit where a helicopter landing was partially located within a Class I stream buffer. Corrective actions were noted in each of the following departures: BMP 12.8, Oil Pollution Control Measures, 12.17, 13.11/14 Erosion Control Measures, Revegetation of Disturbed Areas, 13.5, Identification and Avoidance of Unstable Areas, 14.18, Control of Rock Pit Sediment, 14.6, Timing Restrictions for Constriction Activities/Fisheries Prescription, and 14.9 Drainage Control Structures to Minimize Erosion and Sedimentation.

The only BMPs departures not fully corrected were BMP 12.6 Riparian Area Designation and Protection and 13.10 Landing Location and Designation. This total of four uncorrected departures in three units

were reported from 106 units harvested. This equates to 2.8 percent of the units logged with uncorrected departures. A total of 12 departures that were corrected to "full" implementation were also noted.

Corrective actions taken to meet BMP requirements were departures were noted:

12.8 Oil Pollution Control Measures – A hydraulic line burst on a backhoe. Use was stopped and the backhoe was loaded onto a lowboy and transported off site for repair. No stained soil was shown at the site after cleanup.

12.17 Revegetation of Disturbed Areas – A road cut bank was found unseeded but was later seeded.

13.11/14 Erosion Control Measures – Two small ephemeral streams were within a helicopter log landing area.

13.5 Identification and Avoidance of Unstable Areas – Yarding system changed to helicopter upon approval of soil scientist.

14.18 Control of Rock Pit Sediment – Rock pit used as a waste disposal site.

14.6 Timing Restrictions For Construction – A bridge was removed outside the fish window with ADF&G approval.

14.9 Drainage Control Structures to Minimize Erosion and Sedimentation – Stream had been diverted down ditchline, corrective actions were taken.

Several inconsistencies regarding how the monitoring form was filled out were noted. One Sale Administrator reported corrective action being taken on every monitoring item that applied to the units. Confusion was also apparent on several of the forms regarding the fact that units or roads that departed from approved BMPs could be fully in compliance once following corrective actions being implemented.

10% IDT MONITORING BACKGROUND

The 10% monitoring was completed in three geographic areas: Hassler Island, Shrimp Bay, and Etolin Island. Hassler Island and Shrimp Bay are located on the Ketchikan Ranger District and Etolin Island is located on the Wrangell Ranger District. The monitoring locations were selected by the Interagency Monitoring & Evaluation Group (IMEG) based upon the significant aspects of the unit harvest and road construction associated with these areas.

10% Monitoring Results:

Generally 10 % quality control monitoring completed by IDT was in agreement with the monitoring completed by the Sale Administrator & Engineering Representative and showed that the Best Management Practices (BMP) were being implemented. The roads reviewed at Hassler Island were not complete so evaluation of the implementation of the BMPs was made at the sites prior to completion and during construction. Post haul maintenance will be completed on the roads at Hassler Island & Shrimp Bay. The BMPs will be fully implemented prior to road final completion.

During the IDT monitoring the group noted identified strengths associated with BMP implementation and a few best management practices that need continued emphasis. Identified strengths of BMP implementation included: riparian area designation & implementation of buffers, stream channel protection, yarding systems to protect soil/ water resources, landing locations, timing restrictions for construction activities/ fisheries prescription, design & installation of culverts, erosion control plans, non-point source discharge plans, and oil pollution control measures. During completion of the roads and post haul maintenance, continued emphasis is being placed on BMPs to ensure adequate numbers and

spacing of drainage control structures to minimize erosion & sedimentation, control of excavation/ sidecast, road/ ditch maintenance, and seeding.

Overall the Sale Administrators and Engineering Representatives demonstrated diligent work implementing appropriate protection of the stream courses as well as prescribed suspension, effective culvert installation, minimization of sedimentation. The terrain shown in some of these units and along the road corridors was excessively steep requiring extensive efforts from the SA and ER in administration of the contracts to implement the BMPs.

The units and roads listed below showed Full BMP implementation. Monitoring of these units and roads identified full understanding and application of the Best Management Practices and Standards and Guidelines. Demonstrated was the diligent work of the Sale Administrators and Engineering Representative in implementation to effectively implement appropriate protection of the stream courses as well as prescribed suspension, effective culvert installation, minimization of sedimentation, and endhaul. The terrain shown in some of these units and along the road corridors was excessively steep requiring extensive efforts from the SA and ER in administration of the contracts to implement the BMPs.

Hassler Unit #5529
Hassler Unit #5030
Hassler Road #8460000-0 (includes Hassler LTF)
Hassler Road #8460320
Hassler Road #8460100
Hassler Road #8460400
Hassler Road #8460800
Shrimp Bay Unit #3014
Shrimp Bay Unit #3025
Shrimp Bay Unit #3019
Shrimp Bay Road #8000000 (includes Shrimp Bay LTF)
Shrimp Bay Road #8000000-2
Shrimp Bay Road #8000000-3
Shrimp Bay Road #80000927
Shrimp Bay Road #8000921
Shrimp Bay Road #8000805
Shrimp Bay Road #8000802-1
Shrimp Bay Road #8000802-2
Shrimp Bay Road #8000807

There were several cases where the 10% IDT identified concerns. In the following cases the IDT listed the BMP implementation as being in Departure from Full BMP Implementation but these departures were corrected.

Shrimp Bay Unit #3016

BMP 13.9 Yarding Systems to Protect Soil/ Water Resources:

IDT & ER rated BMP fully implemented; observation – some soil disturbance was evident in unit. Partial suspension was prescribed and implemented in unit to protect the soil resources. Standard and Guidelines specify less than 10 % soil disturbance.

Hassler Unit #5028

BMP 12.6a Buffer Zone Design & Layout:

IDT and SA rated Departure from full BMP implementation; observation 4 trees cut in stream buffer, fine assessed on operator during contract administration. Buffer after trespass >120 feet; buffer is still intact.

Hassler Road # 8460000-1

BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate number & effective culverts but need one more culvert. Road not complete.

BMP 14.12 Control of Excavation/ Sidecast:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - raveling overburden and bared soil slope on down slope edge of helicopter landing area along road segment. Helicopter landing BMP implementation should be rated on the helicopter unit form. Landing still being used, SA will have operator seed.

BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate spacing & effective culverts, need 1 more culvert. Concern addressed in BMP 14.9. Road not complete.

BMP 14.19 Disposal of Slash & Stumps:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - slash & 1 log in ditch line. Road not complete, post haul maintenance not complete. Ditch line will be cleaned prior to final acceptance of units.

BMP 14.20/ 14.22 Road Maintenance/ Access Management:

IDT not rated; observation; water ponding in ditch line, identified problem with one 24" culvert & one 18" culvert partially plugged. Road not complete, post haul maintenance not complete.

Hassler Road # 8460000-2

BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate spacing & effective culverts, need few more culverts. Road not complete.

Hassler Road # 8460000-3

BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate number & effective culverts but need 3 -4 more culverts. Road not complete.

BMP 14.20/ 14.22 Road Maintenance/ Access Management:

IDT not rated; observation - water ponding in ditch line, identified problem with one 24" culvert & one 18" culvert partially plugged. Road not complete, post-haul maintenance not complete.

Hassler Road #8060300

BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:

IDT & ER rated BMP fully implemented; question about ADF&G concurrence on culvert installed at station 11+37 (culvert required fish passage but no timing restrictions). MOU between ADF&G & FS signed 3/16/98, culvert installed before 2/5/98 therefore; specific date of installation was not significant at the time of installation and was not recorded.

Etolin Unit #1A

IDT rated BMP Fully implemented. Buffer on class III stream was implemented as prescribed. Partial suspension on class IV streams implemented as prescribed. Review of the unit card relative to the field unit showed continued emphasis should be placed during the planning phases to ensure accurate mapping of the stream courses relative to the unit layout.

Etolin Unit #5

BMP 13.11/14 Erosion Control Measures:

IDT rated BMP not implemented; observation – road cutslope outside of the unit boundaries showed bared soil and seeding would minimize erosion potential. Seeding outside unit boundary possibly could have been added to the contract. Since road cutslope was not bared as a result of timber harvest activity, seeding these slopes was not part of the contract. Road maintenance crew will hand seed road cut. Comment also addressed on monitoring form for road #51541.

Etolin Road #51541

BMP 14.8/ 12.7 Measures to Minimize Surface Erosion:

IDT rated BMP not implemented; observation road cut outside reconstruction area & unit shows bared soil slopes. Seeding was not included in contract. See comment described under Unit #5.

BMP 14.12 Control of Excavation & Sidecast:

IDT rated BMP fully implemented; observation sidecast/ fill slope of road approaches class II stream, however, due to steep terrain it was not possible to shift alignment further from stream channel.

Etolin Road #6540

BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:

IDT rated Departure from Full BMP implementation; observation culvert replaced on class IV stream but water diverted down ditch line; needs reconstruction of ditch block and catch basin. Road maintenance crew will reconstruct ditch block & catch basin

EVALUATION OF RESULTS

The monitoring showed that the Tongass is implementing the Best management Practices successfully. There was general agreement between the 100 % monitoring effort and the 10% IDT monitoring effort. There were few departures from full BMP implementation that were noted and these departures were in most cases corrected prior to the road and unit was given final inspection. As in 1998 there is still confusion on how to fill out the forms. Further improvement of the forms is needed so that they state more clearly what is expected in each column.

Monitoring Recommendation

Simplify monitoring forms, they are not user friendly and require too much time to enter into spread sheets for analysis. The forms should be in spreadsheet format. Recommendations specific to the monitoring form include: changing the monitoring rating system, simplifying the form and adding a few additional bulleted items. The group recommends the following specific changes: Changing the rating system for the BMP Implementation to a yes/ no system or a system that shows % full BMP implementation, instead of the fully implemented (F) departure (D) not implemented (N) system. Simplify the form to require fewer entries.

Add a bullet for lakes under BMP12.6a Buffer Zone Design & Layout.

Include road & unit headings on all sheets, drop listing stream # and stream class at the top of the form.

BMP14.5 Erosion Control Plan Non Point Source Discharge Plan and BMP 12.8 Oil Pollution Control Measures: Split out the items that are relative to LTFs. Concern was aired that separate LTF documentation is already filled out.

BMP 12.5 Wetlands Protection Measures: Include items specific to SA & units to clarify that this applies to units.

BMP 13.9 Yarding Systems to Protect Soil/ Water Resources: Clarify that only acres should be included that suspension requirements are prescribed for soil/ water resources. Do not include acres that receive suspension that is not prescribed but was completed for convenience of the operator.

BMP 14.5 Erosion Control Plan Non-Point Source Discharge Plan: Add reference to BMP # 14.23 & 14.24.

BMP 14.6 Timing Restrictions for Construction Activities/ Fisheries Prescription: Clarify BMP does not apply to class IV streams. BMP applies to all class I, II streams and protection class A, B streams. BMP applies to class III streams with timing.

BMP 14.14/ 14.17 Bridge/ Culvert Design, Installation & Removal: Clarify BMP applies to culverts with fish timing as well as any live stream. BMP applies to all class I, II, III, IV streams.

The 10% quality control monitoring should be completed by an IDT team that is comprised of FS specialists, monitoring coordinator, and representatives from ADEC and FWS. This group should review units and roads selected through a stratified random process; where the areas showing steeper slopes and more class I & II streams are weighted higher.

When new or controversial standards & guides are used a larger IDT group comprised of FS staff, FS specialists, monitoring coordinator, and representatives should conduct a review during actual implementation.

IMEG IDT Monitoring August 16-19, 1999 Trip Report

Summary:

Listed below is work completed during the annual IMEG IDT implementation monitoring trip conducted August 16-19 and during a conference call on August 26. This TLMP monitoring effort was completed as 10 % quality control implementation monitoring. Implementation of the Best Management Practices are completed on 100% of the units and roads by the Sale Administrators (SA) and Engineering Representatives (ER)/ Contracting Officer's Representatives (COR) during timber sale and public works contract administration.

During this monitoring effort the IDT team filled out the same monitoring forms filled out by the SA and ER/COR. Through comparison and discussion, strengths of Best Management Practices (BMPs) and Standard & Guides (S&Gs) implementation were highlighted as well as areas where we need continued emphasis. Overall, the Forest has demonstrated that we are implementing the Best Management Practices and Standards & Guidelines. The SAs and ER/CORs are effectively implementing the Best Management Practices and Standards & Guidelines. This monitoring effort provided the opportunity to clarify what specific BMPs reference and provide interpretation on application of the form used to document implementation monitoring.

The 10% monitoring was completed in three geographic areas: Hassler Island, Shrimp Bay, and Etolin Island. Hassler Island and Shrimp Bay are located on the Ketchikan Ranger District and Etolin Island is located on the Wrangell Ranger District. The monitoring locations were selected by the Interagency Monitoring & Evaluation Group (IMEG) based upon the significant aspects of the unit harvest and road construction associated with these areas.

Although construction & harvest plans indicated that activity in these areas would be complete prior to the IDT monitoring effort, work at Hassler Island and Shrimp Bay was not complete and the roads/ units not final accepted. Since the work was not completely done, specific activities including final grading, road final construction, and post haul maintenance were not complete before the monitoring was completed. This resulted in some items listed as concerns of the IDT that had been planned to be completed as part of the contracts.

Prework was held prior to the field review in Ketchikan on August 16 and Wrangell on August 18. During the prework, the specific units and roads were reviewed in detail. The monitoring group filled out portions of the monitoring forms from reviewing the NEPA documents associated with each timber sale, planning unit and road cards, sale area maps, wetland soils maps, GIS topographic maps that illustrated the road, units, logging systems and stream classes.

Hassler Island/ Shrimp Bay

Participants:

Carol Jorgensen, Jerry Ingersoll, John Sherrod, Carol Seitz Warmuth, Dennis Landwehr, Randy Spiering, Devin Fox, Cameron Thomas, John Weisz, Andrea Linnenschmidt, Cindy Hartmann (NMFS), Jack Gustafson (ADF&G), Rick Woodsmith (PNW), Carol Hale (FWS), Kevin Hanley (ADEC), Dave Fletcher (conference call)

Hassler Island: IDT Monitored 3 units, 9 roads, 1 LTF

Shrimp Bay: IDT Monitored 3 units, 9 roads, 1 LTF

Hassler Island IDT monitored:

Units: 5030, 5529, 5028, 5022

Roads: 8460000-0, 8460000-1, 8460000-2, 8460000-3, 8460300, 8460320, 8460100, 8460400, 8460800

Hassler LTF

Shrimp Bay IDT monitored:

Units: 3019, 3025, 3014, 3016

Roads: 8000000, 8000000-2, 8000000-3, 8000927, 8000921, 8000805, 8000802-1, 8000802-2, 8000807

Shrimp Bay LTF

Monitoring Results:

Generally 10 % quality control monitoring completed by IDT showed agreement with the monitoring completed by the Sale Administrator & Engineering Representative. Monitoring showed that the Best Management Practices (BMP) were being implemented. The roads reviewed at Hassler Island were not complete so evaluation of the implementation of the BMPs was made at the sites prior to completion and during construction. Post haul maintenance will be completed on the roads at Hassler Island & Shrimp Bay. The BMPs will be fully implemented prior to road final completion. There was confusion identified on completion of the forms and whether the listed BMP applied to some of the units and roads.

During the IDT monitoring the group noted identified strengths associated with BMP implementation and a few best management practices that need continued emphasis. Identified strengths of BMP implementation included: riparian area designation & implementation of buffers, stream channel protection, yarding systems to protect soil/ water resources, landing locations, timing restrictions for construction activities/ fisheries prescription, design & installation of culverts, erosion control plans, non-point source discharge plans, and oil pollution control measures. During completion of the roads and post haul maintenance, continued emphasis is being placed on BMPs to ensure adequate numbers and spacing of drainage control structures to minimize erosion & sedimentation, control of excavation/ sidecast, road/ ditch maintenance, and seeding.

Listed below are the specific BMPs where there was discrepancy between the IDT and SA/ ER on whether the BMP applied to the unit/ road. Following the BMP description is the question that underlies the discrepancy and the respective response, which clarifies the interpretation of the BMP.

BMP 12.5 Wetlands Protection:

Question- if BMP applies, since not designated on sale area map but wetlands protection was implemented.

Response- BMP applies to units as described on unit cards and defined by soil scientist. In some cases, wetlands information is not shown on the unit card specifically but protection measures are defined on the sale area map to protect the wetlands. The BMP is implemented although is not specifically specified on the unit cards on sales developed a few years ago.

BMP 12.6 Riparian Area Buffer:

Question- if BMP appropriate for lake buffer which were implemented.

Response- BMP applies to lake buffers. Area accounted for as a buffer on the form includes area immediately adjacent to the unit, between the unit & lake.

BMP 12.6a Buffer Zone Design & Layout:

Question- if BMP applies to lakes.

Response- BMP applies to lake buffers. Area accounted for in buffer includes area immediately adjacent to the unit, between the unit & lake.

BMP 12.17 Revegetation of Disturbed Areas:

Question- if seeding along road applies to this BMP.

Response- Seeding that is completed in disturbed areas within the unit, which were unexpected, are applicable for this BMP i.e. seeding landslide areas within units.

BMP 13.9 Yarding Systems to Protect Soil/ Water Resources:

Question- if this applies to all partial suspension acres.

Response- BMP applies to all partial suspension & full suspension prescribed to protect soil & water resources.

BMP 13.11/14 Erosion Control Measures:

Question- if this relates to the erosion control plan described in contract specifications. Response- Timber contract provision B6.6 requires erosion control measures. Operator not required to submit specific plan for each unit or for the offering area. Erosion control measures are required and implemented as part of the timber sale.

BMP 13.5 Identification & Avoidance of Unstable Areas:

Question- if this BMP applies, since 72% stipulation was not in standards at time of contract.

Response- Standards & Guides effective at time of contract signature in 1993 had language that described guidelines for steep slopes so this BMP applies.

BMP 14.6 Timing Restrictions for Construction Activities/ Fisheries Prescription: Question- if this BMP applies to class IV streams.

Response- BMP applies to all class I, II streams and protection class A, B streams. BMP applies to class III streams with timing.

BMP 14.14/ 14.17 Bridge/ Culvert Design, Installation & Removal:

Question as to whether this applies only to culverts with fish timing.

Response- BMP applies to all class I, II, III, IV streams.

The units and roads listed below showed Full BMP implementation. Monitoring of these units and roads identified full understanding and application of the Best Management Practices and Standards and Guidelines. Demonstrated was the diligent work of the Sale Administrators and Engineering Representative in implementation to effectively implement appropriate protection of the stream courses as well as prescribed suspension, effective culvert installation, minimization of sedimentation, and endhaul. The terrain shown in some of these units and along the road corridors was excessively steep requiring extensive efforts from the SA and ER in administration of the contracts to implement the BMPs.

Hassler Unit #5529

Hassler Unit #5030

Hassler Road #8460000-0 (includes Hassler LTF)

Hassler Road #8460320

Hassler Road #8460100

Hassler Road #8460400

Hassler Road #8460800

Shrimp Bay Unit #3014

Shrimp Bay Unit #3025

Shrimp Bay Unit #3019

Shrimp Bay Road #8000000 (includes Shrimp Bay LTF)

Shrimp Bay Road #8000000-2

Shrimp Bay Road #8000000-3

Shrimp Bay Road #80000927

Shrimp Bay Road #8000921

Shrimp Bay Road #8000805

Shrimp Bay Road #8000802-1

Shrimp Bay Road #8000802-2

Shrimp Bay Road #8000807

Listed below are the unit and road segments with respective BMPs that were identified as concern areas that the IDT recommends continued emphasis during completion of the roads, units, and post haul maintenance. Ratings listed below for BMP implementation are Departure from Full BMP Implementation (D) and BMP Fully Implemented (F).

Shrimp Bay Unit #3016**BMP 13.9 Yarding Systems to Protect Soil/ Water Resources:**

IDT & ER rated BMP fully implemented; observation – some soil disturbance was evident in unit. Partial suspension was prescribed and implemented in unit to protect the soil resources. Standard and Guidelines specify less than 10 % soil disturbance.

Hassler Unit #5028**BMP 12.6a Buffer Zone Design & Layout:**

IDT and SA rated Departure from full BMP implementation; observation 4 trees cut in stream buffer, fine assessed on operator during contract administration. Buffer after trespass >120 feet; buffer is still intact.

Hassler Road # 8460000-1**BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:**

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate number & effective culverts but need one more culvert. Road not complete.

BMP 14.12 Control of Excavation/ Sidecast:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation – raveling overburden and bared soil slope on down slope edge of helicopter landing area along road segment. Helicopter landing BMP implementation should be rated on the helicopter unit form. Landing still being used, SA will have operator seed.

BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation – most of road segment shows adequate spacing & effective culverts, need 1 more culvert. Concern addressed in BMP 14.9. Road not complete.

BMP 14.19 Disposal of Slash & Stumps:

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation – slash & 1 log in ditch line. Road not complete, post haul maintenance not complete. Ditch line will be cleaned prior to final acceptance of units.

BMP 14.20/ 14.22 Road Maintenance/ Access Management:

IDT not rated; observation; water ponding in ditch line, identified problem with one 24" culvert & one 18" culvert partially plugged. Road not complete, post haul maintenance not complete.

Hassler Road # 8460000-2**BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:**

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation – most of road segment shows adequate spacing & effective culverts, need few more culverts. Road not complete.

Hassler Road # 8460000-3**BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:**

IDT split rating between Departure from full BMP implementation & BMP fully implemented: ER rated BMP fully implemented; observation - most of road segment shows adequate number & effective culverts but need 3 –4 more culverts. Road not complete.

BMP 14.20/ 14.22 Road Maintenance/ Access Management:

IDT not rated; observation - water ponding in ditch line, identified problem with one 24" culvert & one 18" culvert partially plugged. Road not complete, post haul maintenance not complete.

Hassler Road #8060300

BMP 14.14/ 14.17 Bridge & Culvert Design, Installation & Removal:

IDT & ER rated BMP fully implemented; question about ADF&G concurrence on culvert installed at station 11+37 (culvert required fish passage but no timing restrictions). MOU between ADF&G & FS signed 3/16/98, culvert installed before 2/5/98 therefore; specific date of installation was not significant at the time of installation and was not recorded.

Recommendations:

During the conference call on August 26, most of the participants from the Hassler Island & Shrimp Bay portions of the trip discussed the monitoring efforts, which are described below.

IDT recommends changes to monitoring process and monitoring form. Suggestions include that the IDT monitoring be accomplished in two trips by a smaller IDT team and a larger staff IDT group. The 10% quality control monitoring should be completed by an IDT team that is comprised of FS specialists, monitoring coordinator, and representatives from ADEC and FWS. This group should review units and roads selected through a stratified random process; where the areas showing steeper slopes and more class I & II streams are weighted higher. The larger IDT group comprised of FS staff, FS specialists, monitoring coordinator, and representatives should review areas that illustrate implementation of new or controversial standards & guides, timber harvest and road construction sites during actual implementation of the best management practices and standards & guidelines.

Recommendations specific to the monitoring form include: changing the monitoring rating system, simplifying the form and adding a few additional bulleted items. The group recommends changing the rating system for the BMP Implementation to a yes/ no system or a system that shows % full BMP implementation, instead of the fully implemented (F), departure (D) , not implemented (N) system. Simplify the form to require fewer entries. Add a bullet for lakes under BMP12.6a Buffer Zone Design & Layout.

Etolin Island

Participants:

Steve Brady, Dick Cozby (prework), Tyler Gunn, Bill Messmer, Julianne Thompson, Carol Seitz Warmuth, Andrea Linnenschmidt, Jim Cariello (ADF&G), Carol Hale (FWS), Kevin Hanley (ADEC)

Etolin Island IDT monitored: 4 units, 3 roads (segments), 1 Log Loading/ Equipment Ramp Area, 1 LTFs

Etolin Island IDT monitored:

Units: 1A, 1B, 1C, 5

Roads: 6541,6540,51541

Log Loading/ Equipment Area, Anita Bay LTF

Monitoring Results:

Monitoring was completed by the IDT, SA, & ER simultaneously. The IDT, SA, & ER demonstrated agreement on the ratings shown on the forms. Only short road segments of the roads were monitored since the only road work completed, associated with the timber sale, were short reconstruction sections. Since we completed both the IDT and SA/ER forms simultaneously, we were able to address and resolve any discrepancies in BMP application and form interpretation prior to the implementation monitoring.

During the IDT monitoring the group noted identified strengths associated with BMP implementation and a few best management practices that need continued emphasis. Identified strengths of BMP implementation included: riparian area designation & implementation of buffers, stream channel protection, yarding systems to protect soil/ water resources, landing locations, ditch maintenance, control of rock pit sediment, erosion control plans, non-point source discharge plans, and oil pollution control measures. Continued emphasis is being placed on BMPs to ensure effective culvert installation, and seeding implemented to minimize surface erosion.

The units and road listed below showed full BMP implementation. Monitoring of these units identified full understanding and application of the Best Management Practices and Standards and Guidelines. Demonstrated in these units was the diligent work of the Sale Administrators and Hydrologist in implementation to effectively implement appropriate protection of the stream courses as well as prescribed suspension. Demonstrated on this road was the excellent work of the ER and Hydrologist to ensure effective cross drain installation.

Etolin Unit #1B**Etolin Unit #1C****Etolin Road #6541 (includes Anita Bay LTF & log loading/ equipment ramp)**

Listed below are the unit and road segments with respective BMPs that were identified as concern areas that the IDT recommends continued emphasis during completion of the roads, and units. Ratings listed below for BMP implementation are Departure from Full BMP Implementation (D), BMP Fully Implemented (F), and BMP not implemented (N).

Etolin Unit #1A

IDT rated BMP Fully implemented. Buffer on class III stream was implemented as prescribed. Partial suspension on class IV streams implemented as prescribed. Review of the unit card relative to the field unit showed continued emphasis should be placed during the planning phases to ensure accurate mapping of the stream courses relative to the unit layout.

Etolin Unit #5**Bmp 13.11/14 Erosion Control Measures:**

IDT rated BMP not implemented; observation – road cutslope outside of the unit boundaries showed bared soil and seeding would minimize erosion potential. Seeding outside unit boundary possibly could have been added to the contract. Since road cutslope was not bared as a result of timber harvest activity, seeding these slopes was not part of the contract. Road maintenance crew will hand seed road cut. Comment also addressed on monitoring form for road #51541.

Etolin Road #51541**BMP 14.8/ 12.7 Measures to Minimize Surface Erosion:**

IDT rated BMP not implemented; observation road cut outside reconstruction area & unit shows bared soil slopes. Seeding was not included in contract. See comment described under Unit #5.

BMP 14.12 Control of Excavation & Sidecast:

IDT rated BMP fully implemented; observation sidecast/ fill slope of road approaches class II stream, however, due to steep terrain it was not possible to shift alignment further from stream channel.

Etolin Road #6540

BMP 14.9 Drainage Control Structures to Minimize Erosion & Sedimentation:

IDT rated Departure from Full BMP implementation; observation culvert replaced on class IV stream but water diverted down ditch line; needs reconstruction of ditch block and catch basin. Road maintenance crew will reconstruct ditch block & catch basin.

Recommendations:

IDT recommends changes to the monitoring form as listed below:

Implementation Monitoring form: Include road & unit headings on all sheets, drop listing stream # and stream class at the top of the form.

BMP14.5 Erosion Control Plan Non Point Source Discharge Plan

BMP 12.8 Oil Pollution Control Measures: Split out the items that are relative to LTFs on a separate form. Concern discussed that separate LTF documentation is already filled out.

BMP 12.5 Wetlands Protection Measures: Include items specific to SA & units to clarify that this applies to units.

BMP 13.9 Yarding Systems to Protect Soil/ Water Resources: Clarify that only acres should be included that suspension requirements are prescribed for soil/ water resources. Do not include acres that receive suspension that is not prescribed but was completed for convenience of the operator.

BMP 14.5 Erosion Control Plan Non-Point Source Discharge Plan: Add reference to BMP # 14.23 & 14.24.

BMP 14.6 Timing Restrictions for Construction Activities/ Fisheries Prescription: Clarify BMP does not apply to class IV streams. BMP applies to all class I, II streams and protection class A, B streams. BMP applies to class III streams with timing.

BMP 14.14/ 14.17 Bridge/ Culvert Design, Installation & Removal:

Clarify BMP applies to culverts with fish timing as well as any live stream. BMP applies to all class I, II, III, IV streams.

Appendix 2

Summary of Best Management Practices Revisions (FSH 2509.22) Effective 31 October 1996

Provides consistency with Alaska Forest Resources and Practices Regulations (11 AAC 95) of 1993.

TLMP Appendix C (within the Plan document) contains a brief summary. The forest plan provides more detail on several standards and guides (riparian buffers, 72% slope threshold for harvest, etc.) than the BMP handbook.

Chapter 12 Watershed Management

12.2 Rehabilitation After Mass Wasting: Addition. Line Officer or representative informs ADEC directly when mass wasting affects water quality.

12.5 Wetland Identification, Evaluation, and Protection: Expanded. Includes fifteen "33 CFR" BMPs required to comply with silvicultural exemption from Corps of Engineer permit for road construction on wetlands. Burden placed on Forest Service to demonstrate avoidance of and minimal impacts to wetlands. Note application to both temporary and permanent access roads.

12.6a Buffer Design and Layout: Changes TTRA buffers to 100 feet horizontal (not slope) distance.

12.17 Revegetation of Disturbed Areas: Encourages use of hydroseeding.

Chapter 13 Timber Management

13.10 Log Landing Location and Design: Special considerations for landings on slopes exceeding 67 percent or other unstable areas.

13.12 Site Preparation: Addition. Does not apply to coastal rainforest.

13.16 Stream Channel Protection: Expanded. Defines stream classes I through IV. Provides color flagging guidelines. Format is pretty confusing.

Exhibit 1: Crosswalk between BMPs and Timber Sale Contract Provisions and Road Specifications.

Chapter 14 Transportation and Other Facilities Management

14.2 Location of Transportation Facilities: Includes direction to avoid road intersections in wetlands.

14.4 Location, Permitting, and Design of Log Transfer Facilities (LTFs): Strengthens ties to siting guidelines and permitting process.

14.5 Road and Trail Erosion Control Plan: Note example (Exhibit 1).

14.6 Timing Restrictions for Construction Activities: Includes procedure for obtaining variance from fish timing windows. Omits blasting restrictions during saturated soil conditions (in error!).

14.7 Measures to Minimize Mass Failures: Includes ADEC notification of mass wasting. Cites BMP 14.6 for reference on blasting restrictions--they aren't there...

14.8 Measures to Minimize Surface Erosion: More specific. Includes use of waterbars.

14.20 Road Maintenance: Includes inspection of all new culverts within six months of initial high flow events and at least annual inspection of culverts downstream of harvest units for 3-4 years. Stresses identification of "critical culverts".

Exhibit 1: Example of Erosion Control Plan

Chapter 16 Recreation Management

16.1 Recreation Facilities Planning and Location: Expanded specific guidance.

16.5 Management of Off-Highway Vehicle Use: OHV use designated/approved by District Ranger through road management objectives. Stresses monitoring.

Chapter 19 Fire Suppression and Fuels Management

19.5 Emergency Watershed Rehabilitation: References to fire and "burned area" removed. (Why not moved to Chapter 12).

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